



# CITY OF RIVERSIDE FIRE DEPARTMENT

## STANDARD OF COVER 2017

Fire Chief Michael D. Moore

Prepared by Hernandez Contract Services



## Table of Contents

Introduction.....	5
Mission Statement.....	6
Purpose.....	6
Community Expectations.....	7
Documentation of Area Characteristics .....	8
Changing Demographics.....	8
Limitations to Growth.....	16
Land Use .....	17
Description of Agency Programs and Services .....	18
Level of Service .....	18
Services and Divisions.....	19
Operations Division .....	20
Administrative and Support Services Division.....	21
Office of Emergency Management Division .....	21
Fire Prevention Division .....	21
Training Division .....	22
Programs .....	22
Fire Inspection Program.....	22
Educational Programs .....	23
Public Safety Communications Center .....	25
All Hazard Risk Assessment of the Community .....	26
Risk Expectations.....	27
Performance Objectives .....	28
Risk Assessment .....	28
All Risk .....	31
Community Risk Assessment (Target Hazards).....	32
Hazardous Materials .....	34
Wildland Interface .....	34
Swiftwater .....	34
<b>Current Deployment and Performance .....</b>	<b>35</b>
Measurement of System Performance .....	36
Response Times (Baselines) .....	38
Current Performance – 2015 Data .....	41

Evaluation of Current Deployment.....	48
Historical Response Effectiveness.....	50
Analysis of Historical Data.....	52
Areas Out of Compliance.....	53
Coverage .....	53
<b>Response Times</b> .....	55
Response Time Goals (Benchmarks).....	56
Reliability.....	56
Critical Task Analysis.....	57
Plan for Maintaining and Improving Response Capabilities .....	59
Summary of Findings.....	59
Exhibits .....	62

## Introduction

The development of a Standard of Cover (SOC) for the Riverside Fire Department (RFD) is the culmination of an extensive process of analysis, stakeholder input from many sources, and expert assessment and evaluation. The current application of the SOC methodology has escalated as a result of the advocacy of the Commission on Fire Accreditation International (CFAI) for a more systematic means of developing fire agency performance, based on data. The SOC methodology, as provided by CFAI, is recognized as the only means of achieving equivalency for the development of response coverage. The CFAI accreditation process places a strong emphasis on self-assessment with the general premise that the best assessment is a local assessment. The CFAI process outlines a comprehensive and orderly approach to this process. One of the core concepts is the development of a SOC document.

“Standards of Cover” is defined as “those adopted written policies and procedures that determine the distribution, concentration and reliability of fixed and mobile response forces for fire, emergency medical services, hazardous materials and other technical responses.”

This document describes the procedures, decisions, and outcomes of the SOC process for RFD. Detailed analysis and justifications are provided in Reference Materials Sections, attachments and exhibits.

A Community Based Risk Assessment is an analytical process of identifying and quantifying key factors within the community, that when combined, define risk in a way that can be compared to RFD’s response capability. These key factors include historical incident analysis, identification of general and specific hazards, identification of community values and their relationship to departmental expectations, potential severity, consequence, and frequency of certain events. It is this comparison that provides a valuable strategic planning and resources deployment tool for the RFD.

## Executive Summary

The City of Riverside Fire Department (RFD) is pleased to present its Standard of Cover Analysis. The process of risk assessment allows our organization to evaluate risks and determine the proper placement of resources to meet the needs of the community. A comprehensive risk assessment is vital in evaluating the effective distribution and concentration of resources such as station locations and emergency response capabilities within our community.

The RFD Standard of Cover document will serve as a living document and is a work in progress that is subject to change under evolving circumstances. As the community changes environmentally, economically, demographically and politically, the RFD strives to ensure relevant risks are documented and preparation efforts are focused towards protecting citizens and visitors from harm.

The purpose of this document is to clearly define the current risks and deployment status of RFD. This document also serves as a guide with recommendations to improve our response capabilities as we prepare to meet the many challenges and opportunities in providing emergency services during the years to come.

Since its inception in 1887, the RFD has had a proud tradition of providing excellent service to the community. The growing demand for services, combined with the ever increasing costs of service delivery, make it imperative that an effective analysis be put into place that will maintain the high standards expected by the community.

RFD is committed to maintaining public trust through the highest levels of responsibility and accountability. We will remain fiscally responsible in our decision-making, treat everyone with the utmost dignity and respect, ensure our equipment is always in superior working order and ready to respond, and continue to perform to the best of our abilities.

## **Mission Statement**

***The mission of the City of Riverside Fire Department is to protect life, property, and the environment by providing exceptional and progressive, all-hazard emergency services, public education, and safety programs.***

## **Purpose**

The purpose of a Standard of Coverage document is to provide:

- A tool to assess community fire and non-fire risk
- A tool that defines baseline emergency response performance standards
- A tool for planning future station locations
- A tool for determining apparatus and staffing patterns
- A tool for evaluating workload and ideal unit utilization
- A tool for measuring service delivery performance
- A tool that supports strategic planning and policy development relative to resource procurement and allocation

The key elements in the development of a Standard of Coverage document include:

- A determination of levels of service to be provided within the area served
- A community risk assessment that identifies the common and/or unique risks to Riverside Fire Department (RFD)
- An analysis of the RFD's current response capability in terms of time and on-scene performance for personnel and equipment
- Development of a standard of coverage statement that describes how the RFD resources will be allocated and deployed to maximize emergency response effectiveness throughout the RFD

The 2017 Standard of Cover document was completed at the direction of Chief Michael Moore. Deputy Chief La Wayne Hearn managed the project with the assistance of the Deputy Chief Bill Stamper, Battalion Chief Mike Staley, and Senior Administrative Assistant Karen McCoy with input from staff and station personnel and city IT and GIS. The agency used Hernandez Contract Services, Michele Hernandez-project manager, and Gene Begnell, consultant as professional contract knowledge based specialists to complete the document.

## Community Expectations

Obtaining and understanding the desires and expectations of community stakeholders is an important first step. The RFD is committed to incorporating the needs and expectations of residents and policy makers in the service delivery planning process.

It will become increasingly important to emphasize public process and inter-agency communication as the demand for service increases throughout the community. The input received will help guide the RFD vision, planning efforts, policy decisions, and service delivery.

## Stakeholders

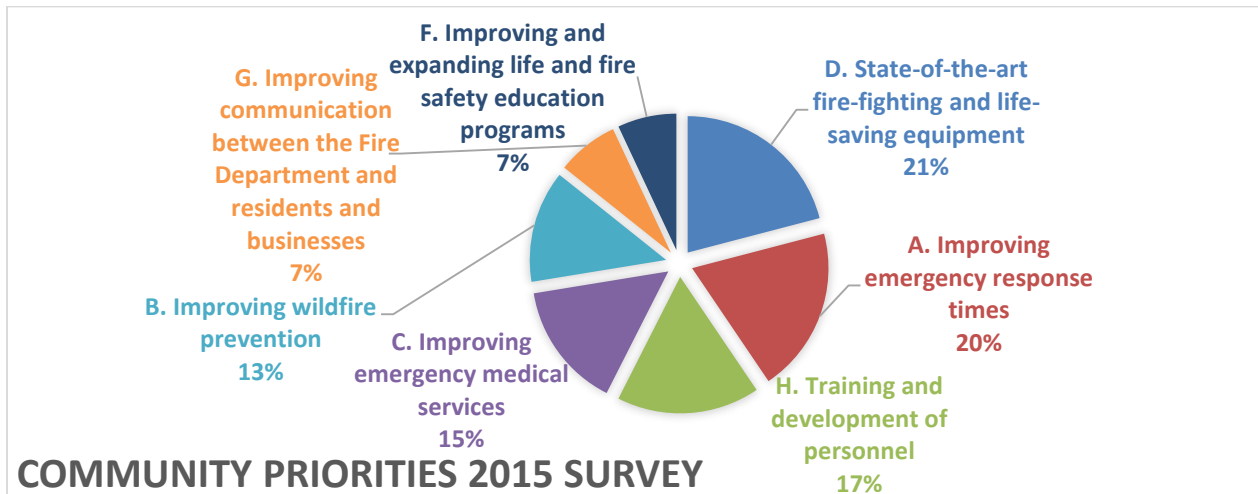
The range of stakeholders involved in this process is extensive. The following were interviewed in the SOC process: Exhibit: Stakeholder Input.doc

Rusty Bailey	Mayor	Alex Nguyen	Assistant City Manager
Mike Gardner	Council-Ward 1	Tony Perna	Battalion Chief/Mgmt Union Rep
Andy Melendrez	Council-Ward 2	Tim Strack	Fire Captain/Local 1067
Paul Davis	Council-Ward 4	Chris Christopoulos	Building Official
Chris MacArthur	Council-Ward 5	Sergio Diaz	Police Chief
Jim Perry	Council-Ward 6	Fire Chief Dave Duffy	Corona FD
John Burnard	Council-Ward 7	Peter Hubbard	AMR

There are key themes that are the result of the stakeholder interviews:

1. Budget is an issue and all understand that fleet costs have been deferred. All stakeholders agree that lack of investment into the fleet in apparatus and capital assets will have impacts for decades to come.
2. Emergency response and community event interaction customer services are regarded by the high majority of stakeholders to be the number one strengths of the fire department.
3. All citizens should be treated equally for service and with professionalism.

In addition to the above listed community stakeholder leader input, Riverside Fire Department conducted a community survey for their Strategic Plan. The following chart notes the top priorities of the citizens:



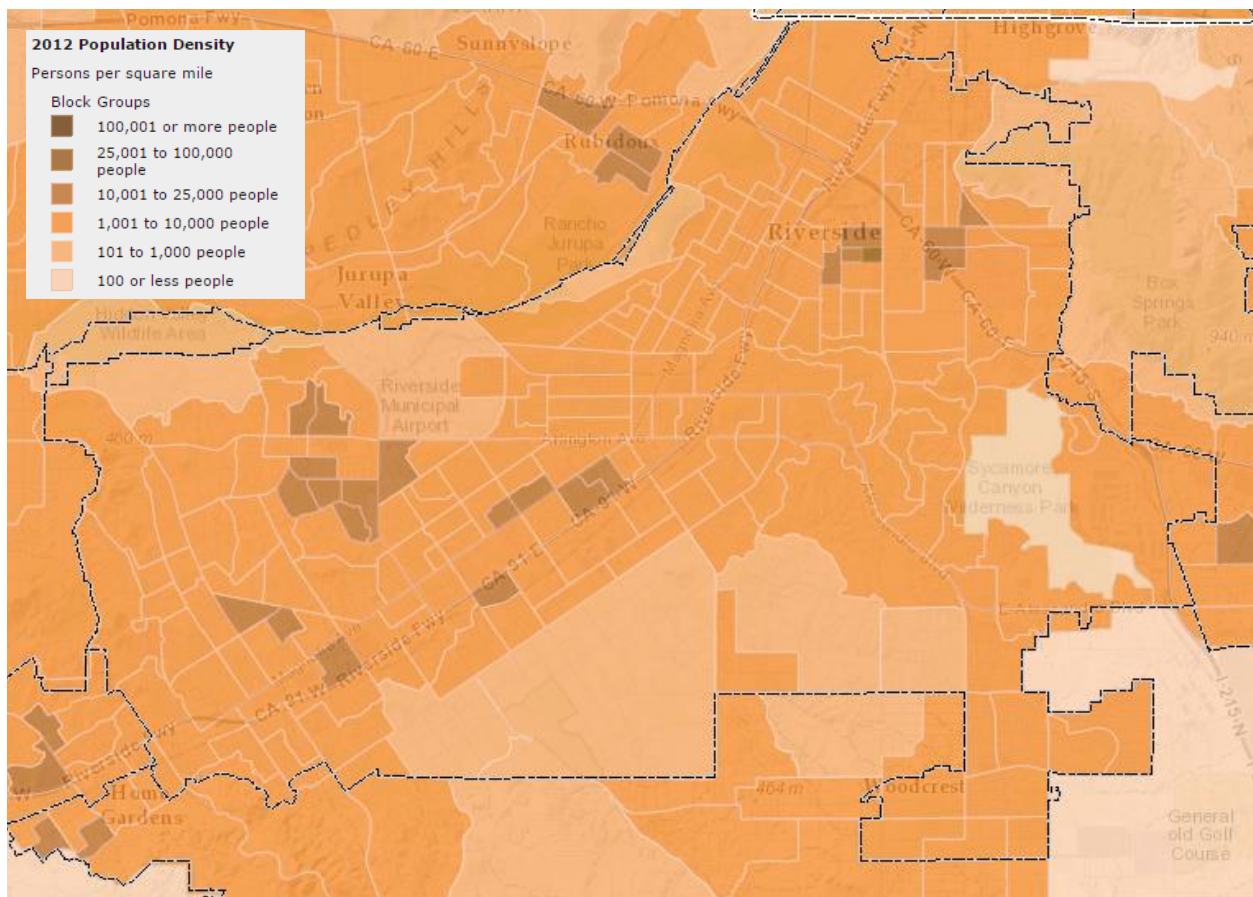


## Documentation of Area Characteristics

### Local and Regional Data affecting all calls for service

#### Changing Demographics

A review of the census data and other regional sources of data show that density (population per square mile) is not a significant issue in most areas (Figure 1 below). Currently, some pockets of higher density exist, but the majority of the protection area is not densely populated and is suburban in nature. It should be noted that increased mid-rise and high-rise residential will change this fact.



**Figure 1**

A review of the Southern California Association of Governments (SCAG) data on population growth indicates that Riverside has increased 19.1% from 2000 to 2010. SCAG projects that the city will increase by 20.2% to nearly 386,600 people by 2040. Population increases are varied around the city with no specific region accounting for the majority of the population increases in the 2000 to 2010 timeframe (Figure 2 on the next page).



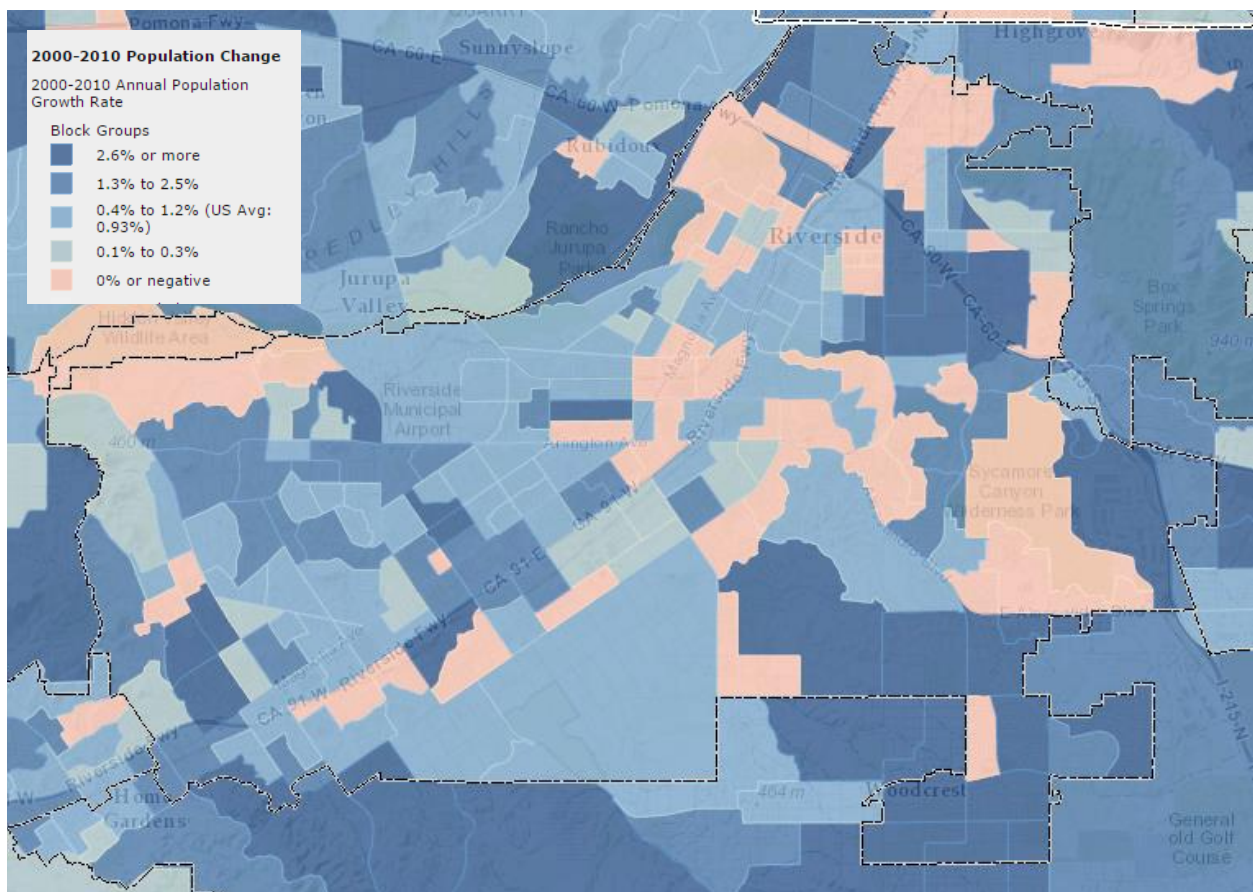
## RIVERSIDE COUNTY/ Riverside City

### Total Population: 2000 and 2010 - Incorporated Cities by County in California

State / County / City	Total Population		Change, 2000-2010	
	April 1, 2000	April 1, 2010	Number	Percent
Riverside city	255,166	303,871	48,705	19.1%

### 2016-2040 RTP/SCS Final Growth Forecast by Jurisdiction

Population2012	Population2020	Population2035	Population2040
310,700	336,300	384,100	386,600
Household2012	Household2020	Household2035	Household2040
92,400	101,200	117,700	118,600
Employment2012	Employment2020	Employment2035	Employment2040
120,000	157,900	195,900	200,500

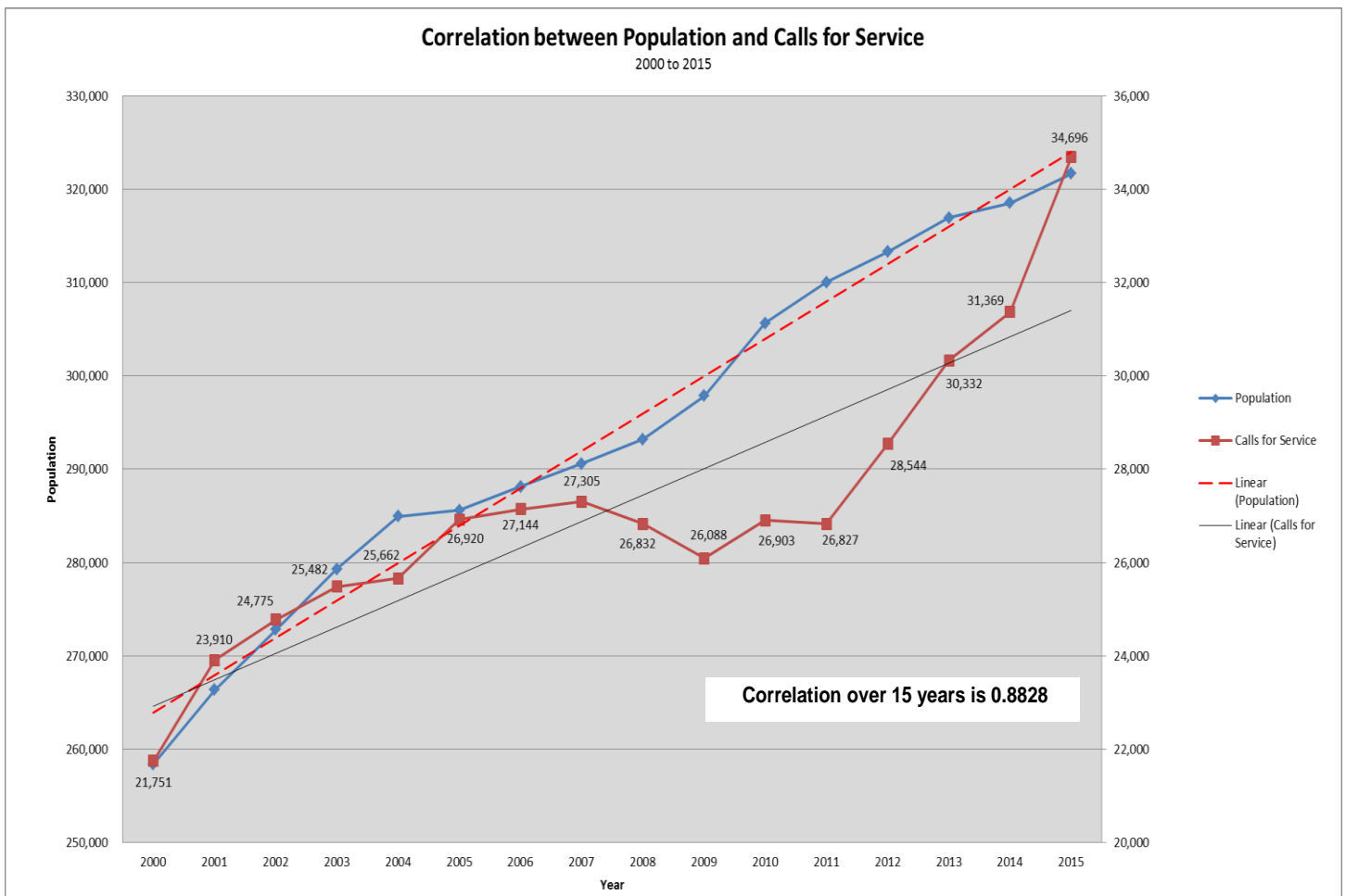


**Figure 2**

In order to project calls for service within the Riverside City Fire Department, it is necessary to define the relationship of population to calls for service that are generated. A simple correlation (not causation) can be established. This simply means that more people will need more calls for service. Population has a direct correlation to risk. RFD has a correlation of .8828 for emergency calls for service shown in relationship to population served. This means that the historical data

indicates that 78% of the variation in calls for service may be explained by the changes in population. High-density population areas, including high-rise residential dwellings, increase the risk associated with that service area. The more people in a given service area, the more incidents, or calls, that are generated. Density is increasing throughout Riverside City, and higher concentrations of population are appearing in areas that historically have not been population centers. Examples include the infill development in the downtown area and the older areas where redeveloped areas are removing one and two family dwellings to replace them with multi-family dwelling (a trend throughout southern California).

Figure 3, below, shows the relationship (correlation) between population and calls for service within the city of Riverside over the past sixteen years. The two trend lines show similar trends but they are not identical (22% difference). The overall population is a good indication of the number of calls for service that can be expected from the fire department.



**Figure 3**

The number of calls per capita (calls per year per city resident) continues to increase overall. The rate at which calls for service are generated continues to rise over time (Figure 4). In the year 2000 the rate was 0.0842 per person or just over 8 calls per 100 residents. By 2017 this rate is 0.1185 or nearly 12 calls per 100 residents; an increase of 33% without the population increases (Figure 5). The overall calls for service increased by 46.7% in the same time period (2000 to 2017). This combination of increased population and increased service demand per capita increases workload within the fire department dramatically.

Year	Call Volume	Population	Calls/Pop
2000	21,751	258,427	0.08417
2001	23,910	266,378	0.08976
2002	24,775	272,814	0.09081
2003	25,482	279,306	0.09123
2004	25,662	284,960	0.09005
2005	26,920	285,615	0.09425
2006	27,144	288,152	0.09420
2007	27,305	290,601	0.09396
2008	26,832	293,207	0.09151
2009	26,088	297,841	0.08759
2010	26,903	305,359	0.08810
2011	26,827	309,705	0.08662
2012	28,544	312,747	0.09127
2013	30,332	316,619	0.09580
2014	31,369	319,504	0.09818
2015	34,696	321,655	0.10787
2016	36,687	324,722	0.11298
2017	38,501	324,722	0.11857

Figure 4

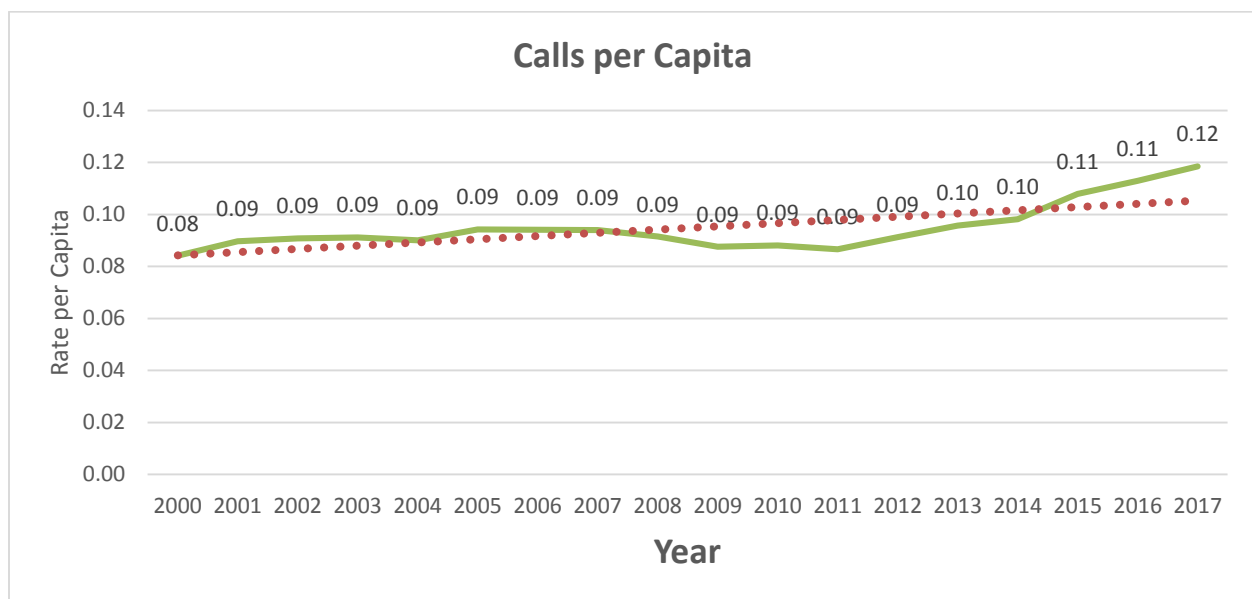
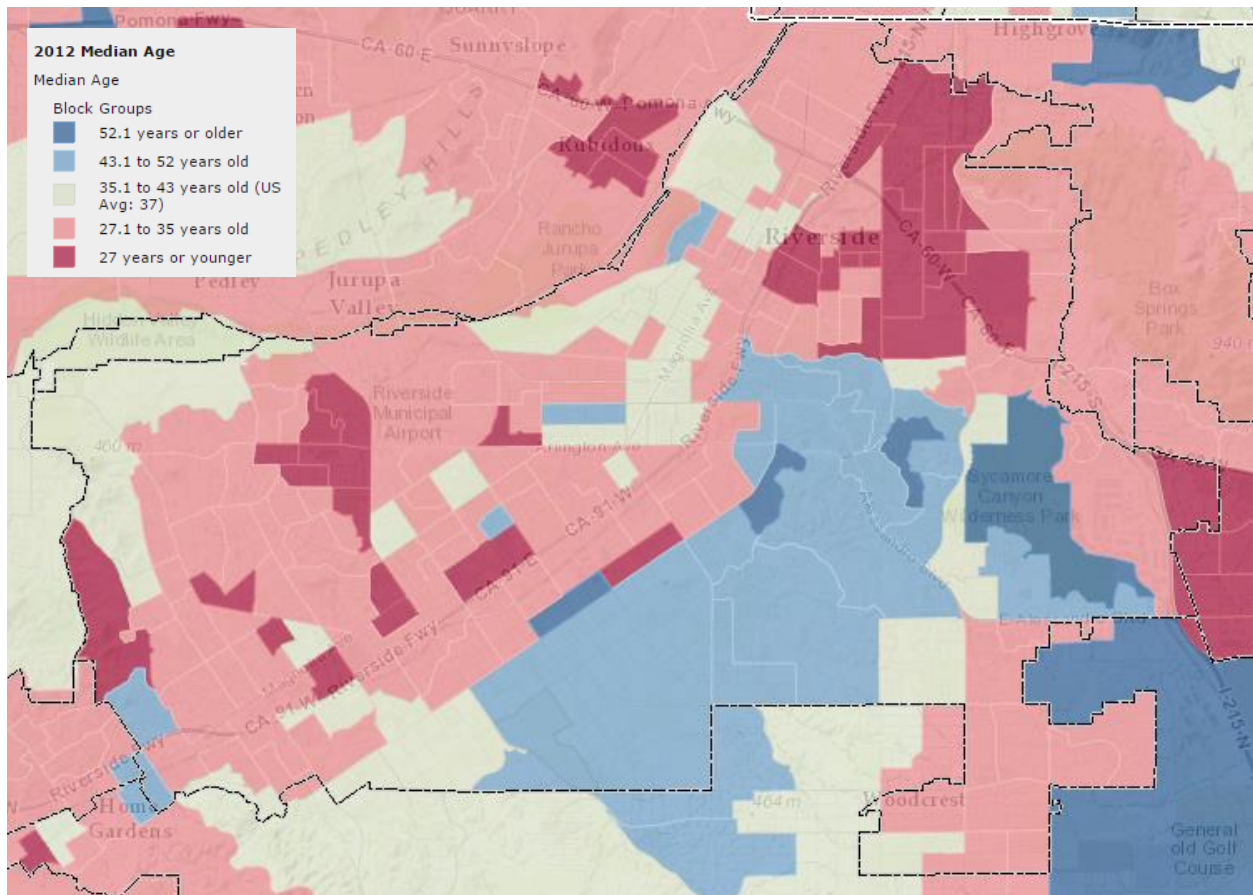


Figure 5

The population makeup in Riverside is changing as well. When the current data is examined for the age of the population served, several areas of elderly population are evident and tend to be the areas of increased call loading. According to the 2010 American Community Survey of Riverside, the average age is 30.9 and comprised of 49% men and 51% women. Figure 6 indicates the median age within the various census blocks within the city; blue areas show the older population and the red areas the younger.

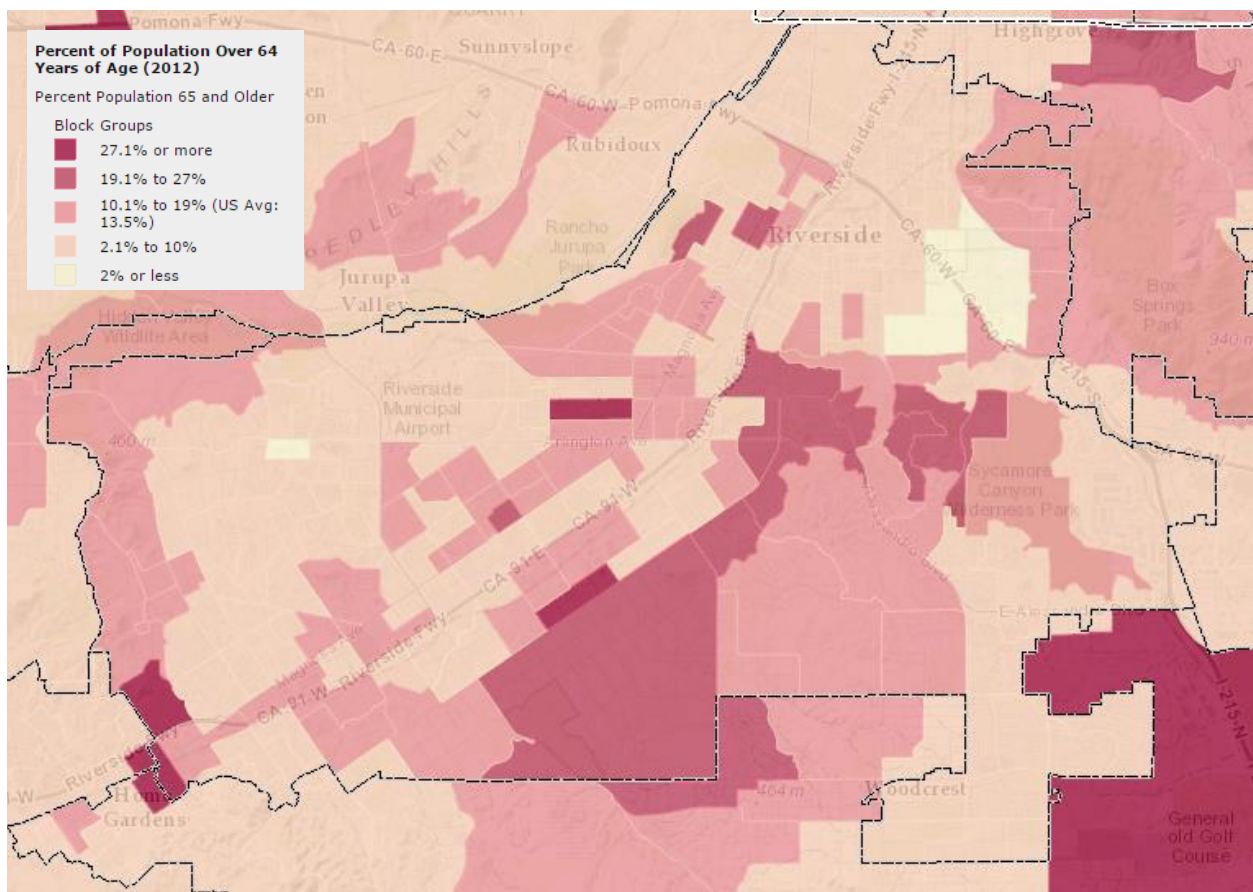


**Figure 6**

Persons aged 65 years or older make up 9.7% of our current population or approximately one in ten. Using age 55, rather than 65, the percentage jumps to 19% of the overall population or nearly two in ten. This is important because of the aging of our society (baby-boomers getting older) and the rate at which the elderly population use RFD emergency services. The majority of this increase will occur by 2030. The doubling effect will have a significant impact on service delivery distribution, workloads, and the reliability of the system.

Figure 7 shows the census block with a higher percentage of persons 65 or older. These are shown as a percentage of the total population within the census block. One quarter (24.2%) of the population within the city is under 18 more than half of those (14%) are under ten years of age (Figure 8). The older and younger residents of the city are target populations which tend to need additional protection in case of emergencies. This may include assistance in egress, increase medical conditions, lessened ability to follow or execute instructions during an emergency or a lack of knowledge or understanding on what to do in an emergency. These population areas require additional levels of service.



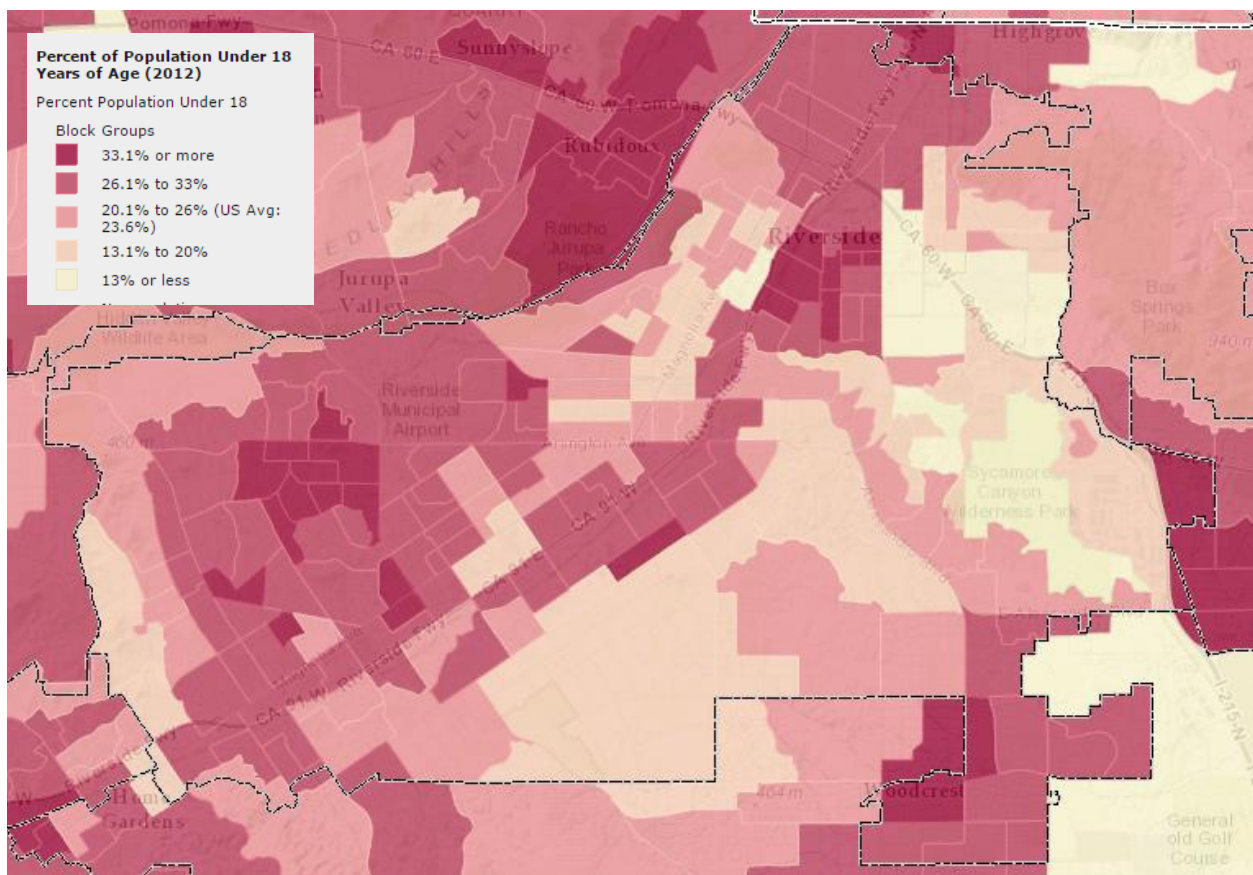


**Figure 7**

In Riverside, 41.7% of the population speaks a language other than or in addition to English. Within that group 15.6% do not communicate well in English. Approximately one third (34%) of the city population speaks Spanish; over half of which are bilingual. The majority of the population (58.3%) does not speak a language other than English. These percentages are consistent with the numbers at the state level in California.

Trend analysis of census data shows that this percentage is likely to increase in the future. The number of calls where responders may encounter language barriers will increase. It may also affect the time it takes to dispatch a call when decisions need to be made, or the length of time on a call to obtain report information and history.

In the City, 55.4% of all housing units are owner occupied. Only 19.7% of families live below the poverty level. Approximately (22.1%) of those living in the City who are 25 or older have a four year degree or higher. These factors create a base population that is generally easier to serve due to lower risk factors associated with affluence and education.



**Figure 8**

## *Infrastructure*

Infrastructure includes streets, water, utilities, stations, housing, and commercial buildings. The age and quality of the infrastructure have a direct correlation on risk and must be considered in the deployment of resources. The age works both ways; older materials burn faster and were not designed to protect the structure from fire or earthquakes in the same manner as those used today. Newer streets are no longer wide and straight, resulting in longer routes and slower driving speeds. Structures are built with higher density resulting in greater exposures and calls to an area. Utilities are being moved underground causing above and below ground safety issues.

The two most significant infrastructure issues for the fire department are water and roads. Access to the scene of an emergency and water supply to fight fires are essential to providing service. In the developed areas, Riverside Planning and Development and RFD Fire Prevention expend a great deal of effort to insure that both are provided during construction and after occupancy.

## *Streets/Traffic Networks*

The street network is the backbone of an emergency response system. Riverside has more than seven hundred fifty miles of surface streets and thirty miles of freeway lanes. The network must be both efficient and effective in order to maximize emergency response. The best-case scenario is a network with direct routes and multiple points of entry. The City has a mix of good and bad areas with respect to overall traffic circulation but the street network generally works well.<sup>1</sup> Lack

<sup>1</sup> Exhibit; Transportation Network.

of efficient circulation within a project, community or region can seriously degrade the ability of the Fire Department to provide effective and rapid response. One of the biggest problems is the planning of a delivery system based on anticipated infrastructure that is not completed. A missing street at a critical point can completely change the service delivery area of a station and the effectiveness of the overall response. The majority of the circulation issues, however, are in the hillside or canyon communities.

Increases in traffic can become a significant negative factor that directly effects deployment. Traffic issues continue to increase in Riverside. Impacts are directly related to growth and demographic changes. Increased traffic presents both distribution (initial response time) and concentration (multiple resource response) problems. If response times lengthen, the effective response area for each station is reduced. If multiple resources from multiple stations cannot arrive in an acceptable time frame, then more resources will be needed within the system.

Some traffic improvement options may actually reduce response times while others simply slow the negative impacts. Increased traffic decreases response performance and increases the potential for accidents. In some traffic situations, with raised center medians, units must simply turn off emergency lights and wait for the traffic to clear before proceeding.

Solutions to this issue are available but may have significant cost. Technology solutions such as Emergency Vehicle Preemption (EPV) are very cost-effective when done in conjunction with other work or when the signal is first installed (CEQA process). Center median breaks, drive-over or crawl-over sections in median or simply leaving painted medians rather than raised medians have positive impacts on responding units.

### *Population Centers*

Population centers are areas with population densities in excess of the majority of the protection area. They are important because there is a direct relationship between population, risk and the impact on workload. Population centers typically exist in the older community areas. This is changing, however, with new developments specifically focused on increasing densities to 50 or more dwelling units per acre. While most density issues revolve around housing units, “job centers” that produce daytime occupancy rates in excess of the housing limits also exist. These “job centers” bring workers and customers into an area which doubles or triples the transient populations during normal business hours. The structures in these are often higher occupancy mid-rise (four and five story) and high-rise (six or more stories/over 75 feet) buildings with large workforces. Several high-density job center properties exist within the RFD protection area.<sup>2</sup>

An additional identified risk area of population is the homeless/transient/mental class of citizens who reside mainly in the river bottom area. The call load includes both fire and EMS and is a high priority of concern at all levels in the city. The core problem is not a Fire Department issue, but it is a challenge to be proactive with education and prevention for the fire services. Partnering with police, social systems, and AMR will be reviewed for future opportunities.

---

<sup>2</sup> RFD High Rise Building Inventory



## Areas of Significant Change

There is a great deal of development still to be completed within the boundaries of RFD. In 2006, the City of Riverside initiated a development process city wide called the Riverside Renaissance. The goal of the Renaissance was to revive areas of the city that needed development. The City Administration realizes that successful cities have downtowns where people want to live. With this understanding, there is a large emphasis being placed on the development of the downtown area. The City of Riverside currently has nine development projects underway that will bring approximately 900 homes to the area. Over the last few years the Fox Theatre, Riverside Municipal Auditorium and the Convention Center were remodeled. The Marriot Hotel was recently developed and plans are in place for the development of the Indigo Hotel in downtown Riverside. The city of Riverside has recently authorized the development of the Cheech Marin Art Museum. The Art Museum offers engaging exhibits, field trips and assembly programs to young people from across Southern California. Exposure to the arts will align with the Next Generation of artist to the Riverside area. It is expected this venue will increase tourism in the downtown area.

### *Specific Areas of Impact*

Towards the east end of the city lies a large unincorporated campus called the March Joint Powers Authority (JPA). In July, 1993, March AFB was selected to be realigned, and subsequently converted from an active duty base to a Reserve Base, effective April 1, 1996. The decision to realign March AFB resulted in approximately 4,400 acres of property and facilities being declared surplus and available for disposal actions, as well as joint use of the airfield. The JPA which was once owned by March AFB is now being developed for commercial use. There is a potential for future annexation into this area. Currently several large warehouses and commercial buildings are in the development process. They will potentially provide thousands of jobs. These jobs could include medical services from pre-natal to hospice care, veterans assistance, and life-enhancing opportunities for residents of the City of Riverside.

## **Limitations to Growth**

### *Construction limits*

Riverside City is rapidly approaching a time of build-out as all of the raw land is developed. Once the current building projects are completed, the built-upon areas of the city may go to higher density in-fill projects. This will have an effect on land values and will increase the pressure on the redevelopment of existing developed areas. Increased density and intensification of uses are expected with correlating workload increases.

### *Infrastructure limitations*

Three infrastructure issues will have the greatest limitation on future growth include traffic, water and sewer capabilities. Traffic trip counts are one of the most limiting factors in growth and development today and will continue to be so in the future. Water and its byproduct (sewage) have shaped the southern California landscape for over a hundred years. The lack of water or sewer capacity to support development is a major issue in many of the California communities. The water issue is why new developments must provide “will serve” documents detailing how the commodities will be provided before development is allowed to proceed. These three issues will continue to drive development parameters. Traffic and water are key and have direct impacts on the ability of the RFD to provide service. As traffic service levels decrease, response times increase

The community that RFD protects is currently adopting downtown area land use plans that utilize the “New Urbanism” concepts. This new orientation to higher densities, transit orientated development, mixed use complexes and the move to a more vertical orientation will have impacts on the resources needed to serve the newly developed areas with increased centralized workloads.

The services present in today's department are based on the land uses and workload issues associated with land use and population. Placements of stations were made based on the need as the area developed. Programs have been supported by the City as it relates to the type of land use permitted.

**General Plan Land Use with Council Ward Overlay City of Riverside**

**Legend**

City boundary	A - AGRICULTURAL	VLDH - VERY LOW DENSITY RESIDENTIAL	MUH - MIXED USE-NEIGHBORHOOD
Ward	ARR - AGRICULTURAL/RURAL RESIDENTIAL	C - COMMERCIAL	MUU - MIXED USE-URBAN
Park	HR - HILLSIDE RESIDENTIAL	CRC - COMMERCIAL REGIONAL CENTER	PF - PUBLIC FACILITY/INSTITUTIONAL
Recreation	SR - SEMI-RURAL RESIDENTIAL	DSP - DOWNTOWN SPECIFIC PLAN	PR - PRIVATE RECREATION
Beltway	VLDH - VERY LOW DENSITY RESIDENTIAL	OSP - ORANGE COUNTY SPECIFIC PLAN	P - PUBLIC PARK
General Plan 2025	LDR - LOW DENSITY RESIDENTIAL	O - OFFICE	OS - OPEN SPACE/CULTURAL RESOURCES
Land Use Element	MDR - MEDIUM DENSITY RESIDENTIAL	BOP - BUSINESS/OFFICE PARK	INT - KANGAROO RAT HABITAT
CRSP	MHR - MEDIUM HIGH DENSITY RESIDENTIAL	I - INDUSTRIAL	
	HDR - HIGH DENSITY RESIDENTIAL		

**Map Labels:** SAN BERNARDINO CO, RIVERSIDE CO, MORENO VALLEY, RIVERSIDE, 7, 6, 5, 4, 3, 2, 1

**Scale:** 0 1.75 3.5 Miles

**Disclaimer:** The City of Riverside makes no warranty on the accuracy or content of the data shown on this map. This map shall not be reproduced or distributed. Land use is current as of January 2014. Copyright 2014, City of Riverside, California. Map revised 02/2014

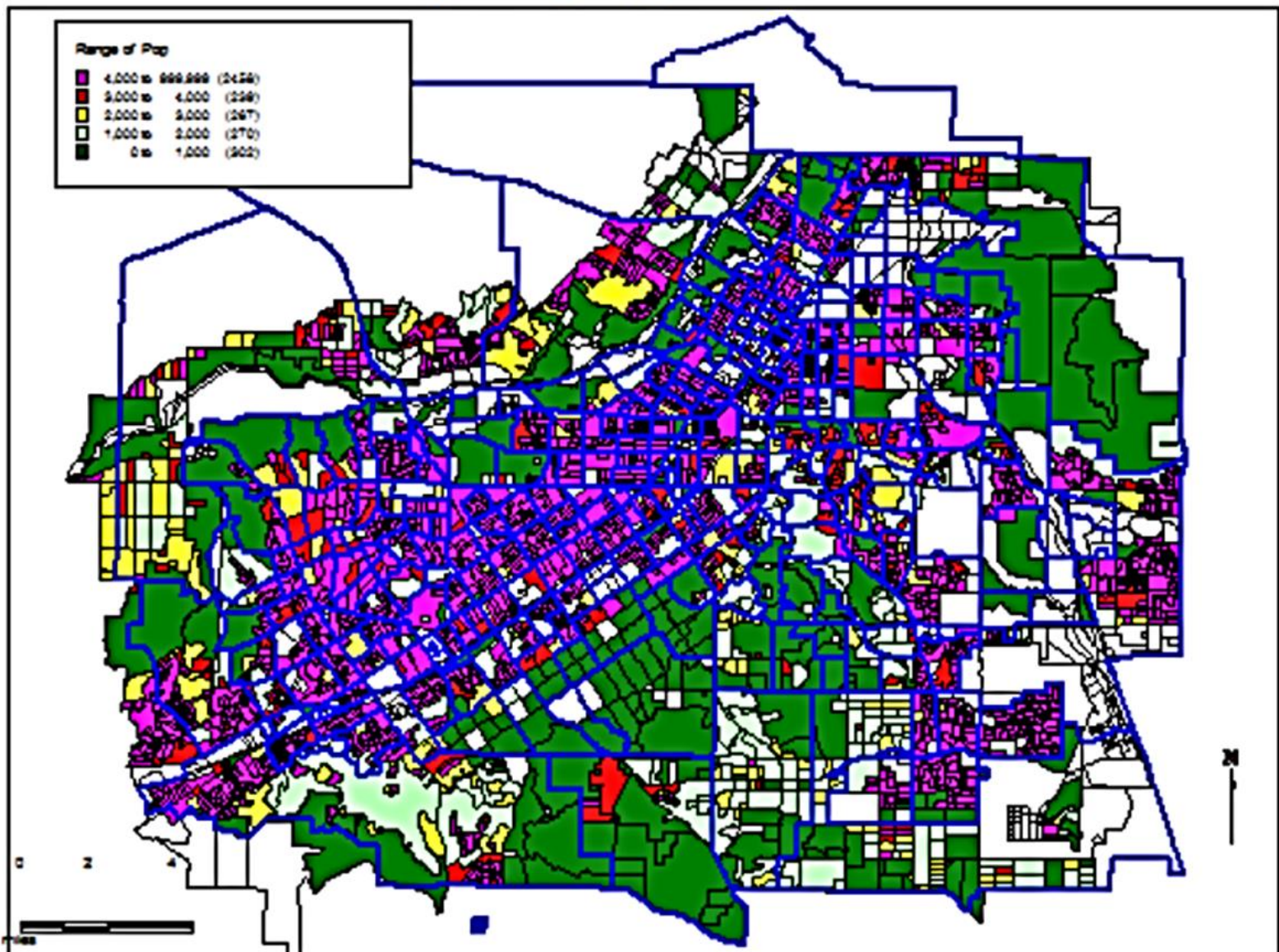


## Description of Agency Programs and Services

### Level of Service

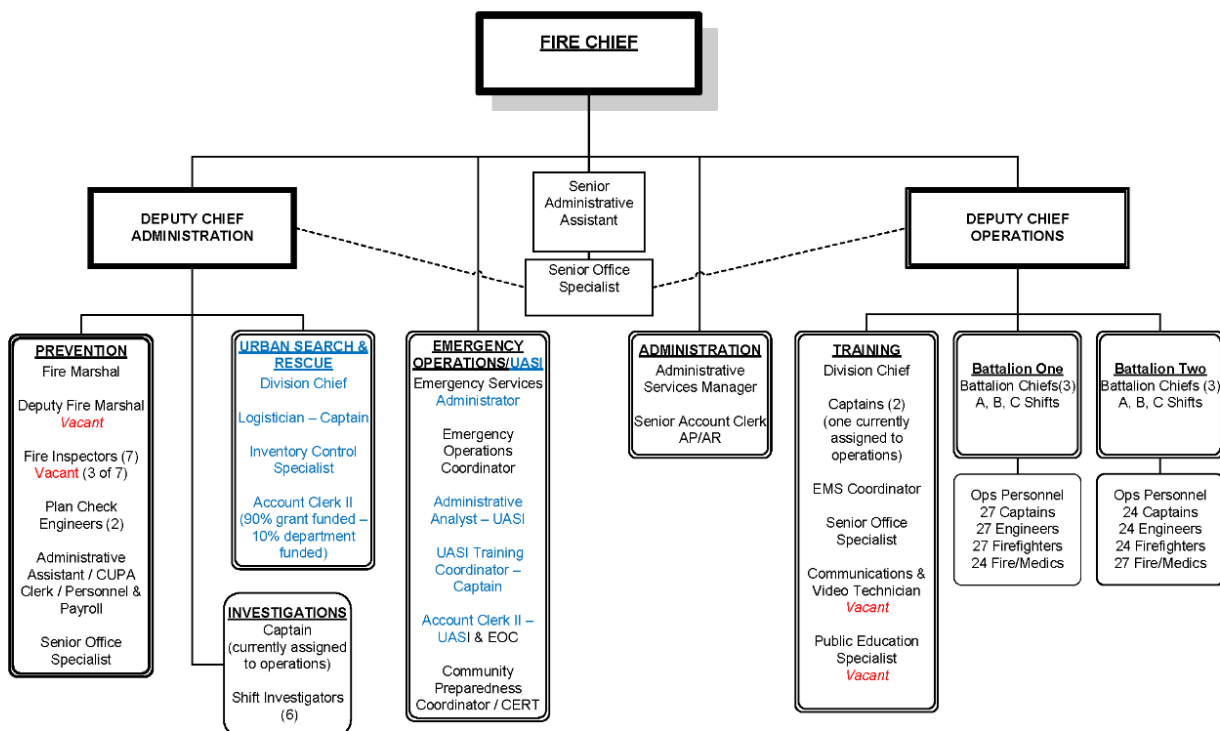
The service area for RFD is complex. It ranges from wilderness interface to dense urban areas with high-rise buildings. The overall service area is considered urban. Currently there is not a high density of residential mid to high rise buildings. Business use is intermingled with residential. In some areas large undeveloped land is blended with housing. For these reasons and the interest in maintaining equal service to all areas, and the layout of population across the city, Riverside Fire Department will maintain one standard of cover to all areas of the City.

### Population per Square Mile



## Services and Divisions

The Riverside Fire Department operates out of 14 fire stations serving over 321,000 residents in the City of Riverside. On duty staffing consists of 70 on duty personnel. These personnel staff 14 career fire stations. At least 17 of these personnel are certified paramedics.<sup>3</sup> There are six divisions: Administration, Office of Emergency Management, Fire Prevention, Operations, Training and Urban Search and Rescue. Operations employs 211 full-time firefighters, housed 24/7 in 14 strategically located fire stations spanning a primary response area of over 81 square miles. In addition, there are 23 administrative and support personnel in Fire Admin, Fire Prevention and US&R. Emergency Preparedness is staffed by 6 personnel.<sup>4</sup>



### Legend:

- Items in blue text are grant funded positions.
- CERT: Community Emergency Response Team
- CUPA: Certified Unified Program Agency
- EMS: Emergency Medical Services
- EOC: Emergency Operations Center
- UASI: Urban Area Security Initiative

Within the Operations Division, there are two battalions assigned to field operations. Front line apparatus (those units staffed for immediate response) includes 14 paramedic assessment engines, 3 paramedic assessment squads and 3 trucks, which are basic life support units. The department emergency response fleet also includes a hazardous materials response unit, heavy rescue unit, 2 brush engines, 2 water tenders, swift water rescue capabilities, and a federally sponsored urban search and rescue task force.<sup>5</sup>

<sup>3</sup> Staffing Matrix RFD.

<sup>4</sup> RFD Organizational Chart

<sup>5</sup> List equipment and assigned station

RFD provides a full range of services including:

Medical Assistance: Medical Aids; Multi victim incidents; Mass casualties

Fire Suppression: Fixed Property – structures, dwelling, high-rise; Mobile Property – vehicles, trains, boats

Rescue Services: Trapped or at risk victims; Urban Search and Rescue (confined space, trench, building collapse); Swift Water Rescue

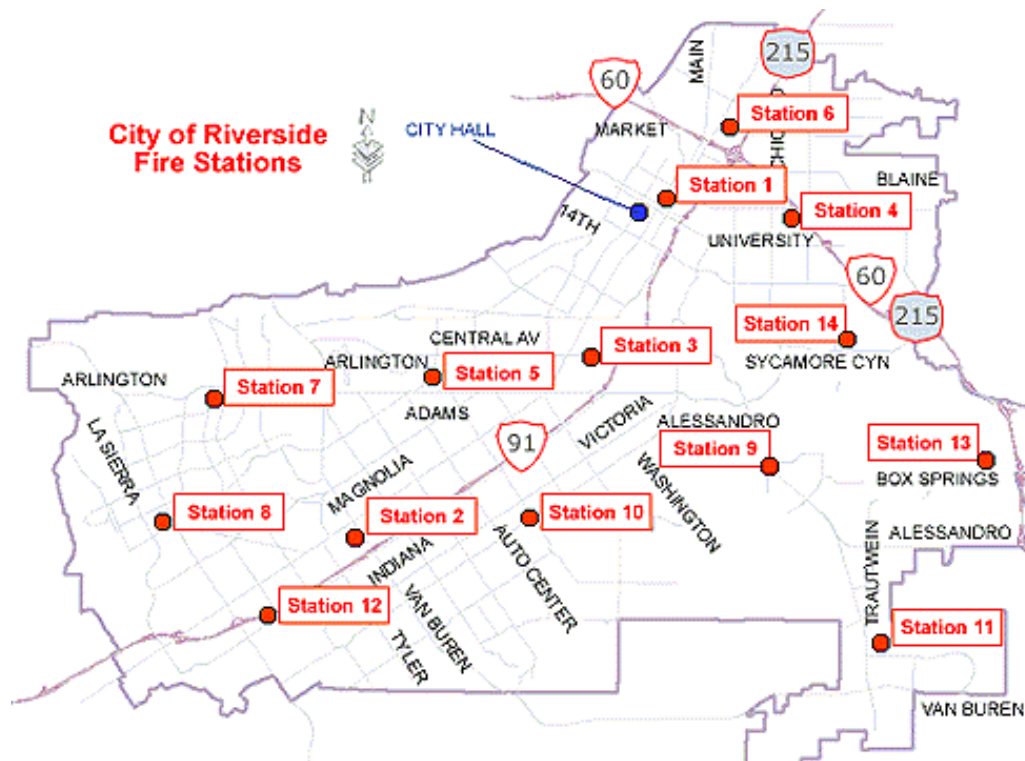
Special Hazards Response: Hazardous Materials

### *Cooperating Agencies*

In addition to the RFD, there are two other municipal fire departments (Corona and Colton) and one military fire department (March ARB). Most of these departments participate in mutual/auto aid agreements with the RFD. The RFD also maintains mutual and/or automatic aid agreements with Riverside County (CALFIRE) and San Bernardino County.

### **Operations Division**

Under the direction of a Deputy Chief, the Operations Division responds to over 30,000 emergency calls annually. In addition to firefighting and both Basic and Advanced Life Support services, Operations personnel are skilled in Heavy Rescue, Technical Rescue, Hazardous Materials Response and Water Surface Rescue specialties. Mutual and automatic aid is provided to our immediate neighbors and communities throughout the State through the California Emergency Management Agency (Cal-EMA) mutual aid system.



## **Administrative and Support Services Division**

RFD provides its own support and administrative services in conjunction with city staff. Headed by the Fire Chief, and under the direct supervision of Deputy Chief LaWayne Hearn. Fire Administration is responsible for the day-to-day management of the department. Fire Administration provides policy direction, leadership, vision to our members, and plays a key role in securing the resources necessary to carry out our Department Mission. Fiscal management, internal affairs, information technology, human resources, labor relations and special projects are under the purview of Fire Administration.

Fire Administration includes the Office of the Fire Chief, the Administrative Deputy Chief, Administrative Services Manager, one Senior Administrative Assistant, one Senior Account Clerk, and one Senior Office Specialist. Together Administration oversees an annual operating budget of \$40.8 million and grants totaling \$2.5 million.

## **Office of Emergency Management Division**

The City of Riverside's Office of Emergency Management (OEM), also known as the City of Riverside Fire Department Emergency Services Division, administers a comprehensive all-hazards community based emergency management program. Riverside OEM promotes a disaster resistant and resilient community through partnerships with all levels of government entities, businesses, non-governmental organizations and the residents and visitors of the City of Riverside.

The welfare and safety of city residents and visitors is of utmost importance to the Office of Emergency Management. The Office of Emergency Management plans and prepares for emergencies, incidents and events that will have an impact on the City of Riverside. OEM maintains a robust preparedness effort through our Community Emergency Response Team training. The training includes providing public education events directed at the city's residents. Working with partner organizations, we work to identify and mitigate issues prior to an incident. OEM also coordinates the response and recovery efforts through the activation of our EOC.

[Click Here for Local Hazard Mitigation Plan Update Report](#)

## **Fire Prevention Division**

The Fire Prevention Division is located at 3900 Main St., on the 3rd floor of City Hall. The Bureau is headed by a Fire Marshal and consists of two plan check engineers, six fire inspectors, an Administrative Assistant/Hazardous Materials Clerk and a Senior Office Specialist.

The Bureau currently enforces the 2013 California Fire, Building, Electrical, Mechanical, Plumbing and Residential Codes, as amended by the Riverside Municipal Code, in addition to National Fire Protection Association standards; Title 19, of the California Public Safety Code; and, the California Health and Safety Code.

In March 1993, the City of Riverside implemented an Automatic Fire Sprinkler Ordinance. All new construction, including single-family homes, are required to install an automatic fire sprinkler system when the structure is being built.



## Training Division

The purpose of the Training Division is to provide a reliable, up-to-date source of educational and practical information to both fire personnel and the public. The Training Division is responsible for the on-going training of all fire companies. There are numerous requirements placed upon the fire service today by the regulatory agencies: NFPA, ISO, OSHA and Regional EMS. The Training Division coordinates the training needed to comply with established regulations.

The Training Division aims to equip all levels of firefighters from the new recruit to the seasoned veteran with the knowledge, skills, and abilities necessary to handle the rigors of their job and to stay safe. Learning takes place through classroom lecture and practical drills at our state-of-the art training facility. At the stations training is augmented by LMS (Learning Management System) an on line resource.

Another pivotal responsibility of the training division is to act as safety officers during significant incidents within the city. Additionally, they handle the public information duties by addressing the media and issuing press releases for incidents as well as events within the department.

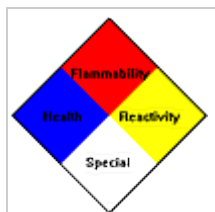
The Training Division is overseen by a Division Chief who is assisted by two Training Captains, an EMS Coordinator, along with a Senior Office Specialist.

## Programs

### Fire Inspection Program

The purpose of the Fire Prevention Program is to prevent injuries, deaths, business interruption and property damage resulting from fires. In accordance with the California Fire Code and the Riverside Municipal Code, the Riverside Fire Department is required to inspect all Riverside businesses for fire safety. The frequency of the inspections depends on state laws, industry standards and general life safety hazards.

If fire code violations are found, an inspector issues a written inspection report and schedules a re-inspection to confirm that the violation(s) have been corrected. Most violations must be corrected within 10-15 days.



Other programs the bureau implements include the Hazardous Materials Business Emergency Plan (BEP) and investigating environmental crimes in conjunction with the Riverside County District Attorney's Environmental Crimes Task Force and the APSA (Aboveground Petroleum Storage Act) program.



## Educational Programs

The RFD believes in the prevention of fire and injury through proactive education. The department liaisons between schools, businesses, and other organizations to provide information regarding fire and life safety topics.

Programs include:

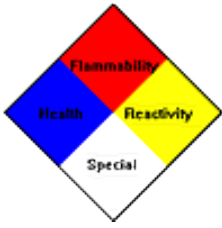
- Every 15 Minutes
- Risk Watch
- Purple Ribbon Month
- Fire Expo/Open House
- Learn Not to Burn
- File of Life
- Fire Station Tours
- School Visits
- Fire Extinguisher Training
- Water Awareness
- Disaster Preparedness
- Career Days

Participation in special activity requests by the RFD is provided by on duty fire crews and managed through the Training Division.



### CERT

Under the direction of the Office of Emergency Management, CERT teams help provide critical support by giving immediate assistance to victims, providing damage assessment information, and organizing other volunteers at a disaster site.



### Hazardous Materials

The Department cross-staffs a Hazardous Materials Response Team that is ready to respond to any spill or release of a hazardous product. This team is a state certified Type 1 team, the only Type 1 team in the county. They are here to provide safety for our residents, businesses and visitors to the city.



### Urban Search and Rescue/Technical Rescue

The RFD is the Sponsoring Agency for the FEMA Urban Search and Rescue, California Task Force 6. This task force is one of 28 in the nation. In addition to having a federally funded US&R team, the fire department also has a Type 1 Heavy Rescue team. Our organization has the ability, resources and expertise to perform technical rescue in a manner that will suit the community's needs.



### Explorer Post 101

The program is sponsored by the Boy Scouts of America and designed to introduce young men and women to a career in the fire service. The program provides education, training, and a strong positive work ethic to further prepare Fire Explorer Cadets for a career in the Fire Service.



### Arson Investigations Unit

The Arson Investigations Unit is comprised of a Captain and six on shift investigators. This team conducts the follow up investigations on fires, and if needed will assist on scene company officers with determining Origin & Cause. This unit is also part of the Riverside County Arson Task Force, a multi-agency task force comprised of members from the Federal Bureau of Alcohol, Tobacco and Firearms (ATF), Riverside Police Department and the Fire Department.



### Emergency Medical Services

Emergency Medical Service in the city is provided through the Fire Department. All of our city's fire engines and rescue squads have paramedic firefighters staffing them. This allows for a rapid response to medical emergencies.

The City of Riverside has partnered with "My Safe Riverside" <http://mysaferiverside.org/what-we-do/-MySafe:Riverside>. This is a unique public/private partnership between the Riverside City Fire Department and the parent organization of the California Fire Prevention Organization. Together, they bring a new wave of fire and life safety education to the City of Riverside.

## Public Safety Communications Center

The City of Riverside Public-Safety Communications Center dispatchers are trained to handle a variety of Police, Fire and Medical emergencies under the management of the Riverside Police Department. They are responsible for receiving, prioritizing and sending appropriate assistance to citizens and visitors of the City of Riverside. The fire dispatchers are trained and certified in Emergency Medical Dispatching (EMD).



The Center is staffed by 41 Public Safety Dispatchers and six Communications Supervisors. The Center has served as the City's Public Safety Communications Center for both the Police and Fire Departments since 1984, when the dispatch centers for both departments merged to form one centralized answering point for all emergency services. Public Safety Communications personnel handle over 500,000 telephone calls annually.

## All Hazard Risk Assessment of the Community

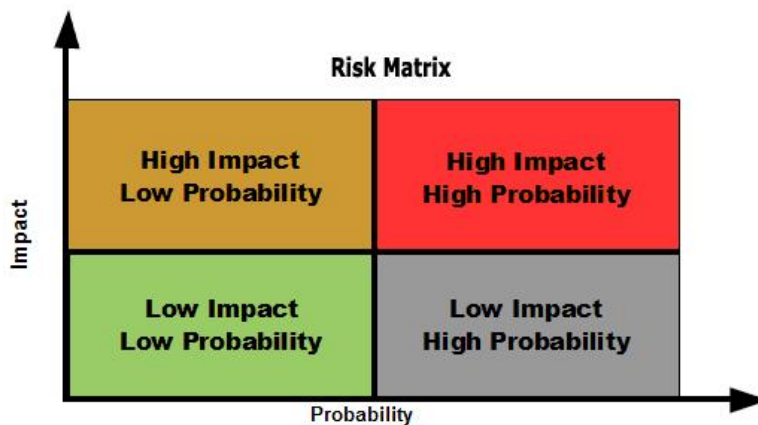
Community Risk Assessment is a critical step in the process of developing a Standard of Cover. Risk analysis should identify, define, and describe the types of all-risk problems that dictate the overall deployment of RFD resources.

Risk Assessment is the process of examining the events that may occur within a jurisdiction and projecting the potential impacts of those events on the community. It is the goal of the SOC process to match the deployment of resources with the identified risk in the most effective manner possible. The steps in this effort include:

- An examination of the nature of the hazard(s) that exist
- Identification of the values and property at risk
- Evaluation of the impact and consequence of an event
- Consideration of the potential frequency of an event

The RFD responds to a variety of risks and each type of risk may have different resource needs. In the SOC process, deployment is analyzed from the basis of all-hazard risk. Some risks require a greater deployment of resources than others to achieve an acceptable outcome. The RFD deployment strategy is based on the goal of providing the needed resources to handle the risk. It is quantified by considering how many people must arrive within a specific time frame with the appropriate equipment in order to achieve the desired outcome. The entire system comes down to a calculation of the speed and weight of initial attack resources needed to control the emergency at hand.

The relationship between probability and consequences is one of the principles used in risk analysis. This concept is critical to the eventual establishment of risk levels for each area served. As either factor increases, it will impact the overall risk. The probability and consequence establishes the overall risk factor for any given situation.<sup>6</sup>



<sup>6</sup> Probability Consequence Risk Chart.

## Risk Expectations

Each community must identify an accepted level of service. Accepted Risk is a relative term that is determined by considering expected and desired outcomes, availability of resources, and cost. The process of establishing what is “right” for the community is a policy decision. It is important to capture the expectations of the community at the start of the process in order to build the appropriate criteria.<sup>7</sup>

The current City of Riverside General Plan (Public Safety) is a comprehensive look at risk in the city and was vetted through the California Environmental Quality Act process allowing all citizens, internal agencies and external agencies, both state and federal, input for validating the plan. Several sections of the plan are used in the risk assessment.

The stakeholder interview process identified the following for economic and cultural risk: *Overall, stakeholders all list the 4 college/universities as highest risks closely followed by 4 hospitals and 2 malls. Various discussions about risk of transportation failures and content distributed throughout city. The highest economic risk for businesses are Bourns Industries and K&N Filters. The cultural draw centers on Mission Inn, Fox Performing Arts Theater, and downtown district.*

The next step in this examination of risk is to look at the mission and goals established by the organization. The second is to establish performance objectives for each service that is provided. The final step is to develop specific performance measures for each service provided in each risk category.

## Mission and Goals

The general mission of most fire departments is similar in that it relates to what the fire department does:

Limit the risks to the community and its citizens from injury, death and property damage associated with fire, accidents, illness, explosions, hazardous materials and other natural and/or manmade emergencies through mitigation.

RFD has taken this general idea and expanded its mission statement to reinforce the purpose of the organization and the values it will carry into the community.

*The Mission of the City of Riverside Fire Department is to protect life, property, and the environment by providing exceptional and progressive, all-hazard emergency services, public education, and safety programs.*

---

<sup>7</sup> See Section 3; Community Expectations.

## Performance Objectives

The RFD has developed objectives for each of the major services it provides; fire suppression, emergency medical services (EMS), rescue, and special hazards. These performance objectives further define the quality and quantity of service to be provided:

### Fire

*For all fire incidents, RFD shall arrive in a timely manner with sufficient resources to stop the escalation of the fire and keep the fire to the area of involvement upon arrival. Initial response resources shall be capable of containing the fire, rescuing at-risk victims and performing salvage operations, while providing for the safety of the responders and general public.*

### EMS

*For all emergency medical incidents, RFD shall arrive in a timely manner with sufficient trained and equipped personnel to provide medical services that will stabilize the situation, provide care and support to the victim and reduce, reverse or eliminate the conditions that have caused the emergency while providing for the safety of the responders. When warranted, timely transportation of victim(s) to appropriate medical facilities shall be accomplished in an effective and efficient manner.*

### Rescue

*For all incidents where rescue of victims is required, RFD shall arrive in a timely manner with sufficient resources to stabilize the situation and extricate the victim(s) from the emergency situation or location without causing further harm to the victim, responders, public and the environment.*

### Special Hazards

*For all special hazards such as Hazardous Materials and Swiftwater rescue, RFD shall arrive in a timely manner with sufficient resources to stabilize the situation, stop the escalation of the incident, contain the hazard where applicable and establish an action plan for the successful conclusion of the incident while providing for the safety and security of the responders, public and the environment.*

## Risk Assessment

Fires: No part of Riverside is immune from fire danger. Structural and automobile fires represent the most common types of fire in urbanized areas and can be caused by a variety of human, mechanical and natural factors. Urban fires have the potential to spread to other structures or areas, particularly if not extinguished promptly. Proactive efforts, such as fire sprinkler systems, fire alarms, fire resistant roofing and construction methods, can collectively lessen the likelihood and reduce the severity of urban fires.

Areas of dense, dry vegetation, particularly in canyon areas and on hillsides, pose the greatest potential for wildfire risks. Urban/wildland interface fires occur when a fire burning in wildland vegetation gets close enough to threaten urban structures. The major urban/rural interface areas of



high-fire risk include Mount Rubidoux, the Santa Ana River Basin, Lake Hills, Mockingbird Canyon/Monroe Hills, Sycamore Canyon, Box Springs Mountain and La Sierra/Norco Hills. Development into this natural landscape will increase the potential risk of fire damage to people and personal property. The assessment of fire risk requires an understanding of fire flow demand and capability, probability of emergency incidents, consequences to life safety, and economic impact to the community served.

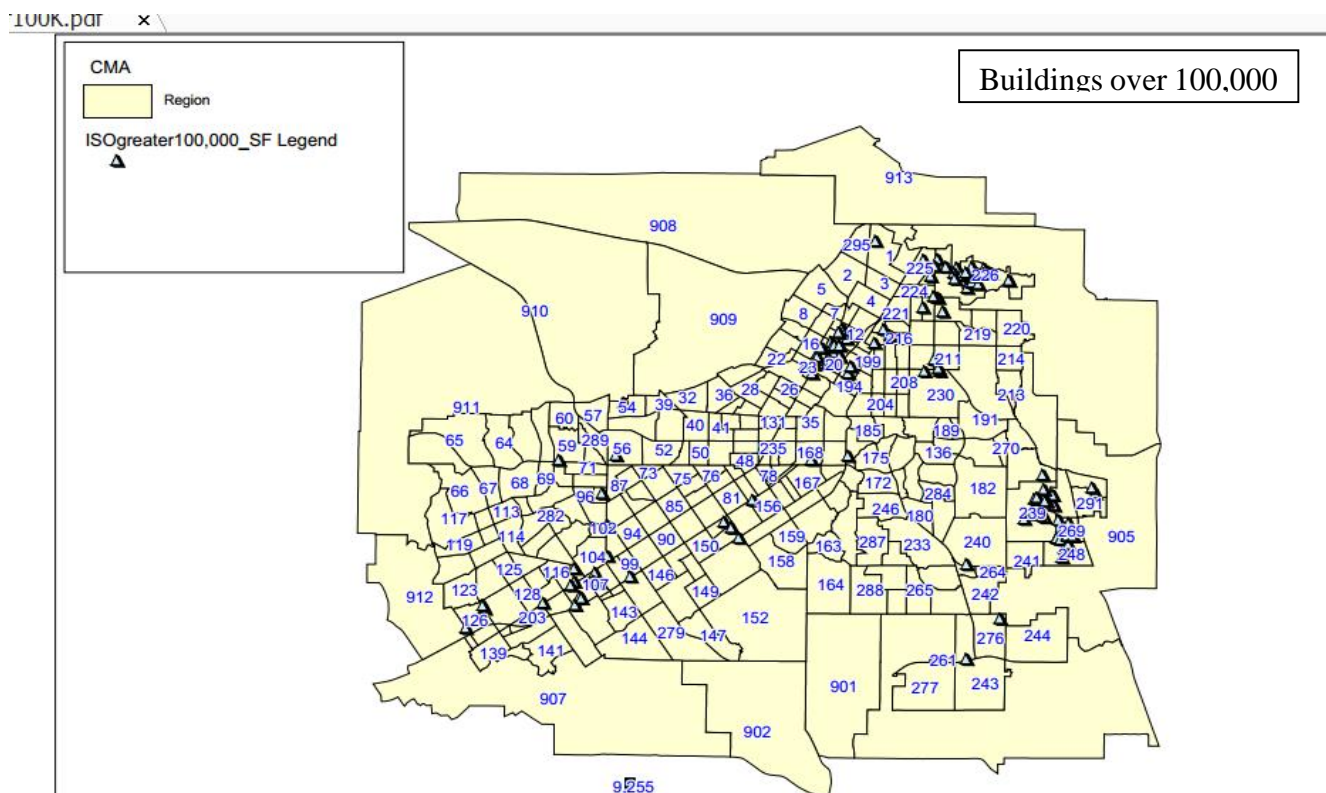
Common fire and life safety factors, such as fire flow and code compliance for life safety, are used to determine risk classification. Risk classifications range from Low, Moderate, High and finally to Special/Maximum. Single family dwellings, considered typical or moderate risk, comprise the majority of most communities.

### *Building Stock*

Structure fire risk assessment is performed on the community's building stock, excluding Adobe homes and brick buildings. Riverside Fire Department has 98,444 dwelling units with an average age of 48 years. Only 2.5 percent of the total housing units were built before 1940 and half of the housing stock was built in the 1960's and 1970's. The actual inventory of building stock within the city ranges from historic adobe homes to high-rise buildings as high as 20 stories.<sup>8</sup> The majority of large commercial structures are protected with fire sprinklers systems. Residential dwellings in some areas are protected with residential sprinkler systems, however, most are not.

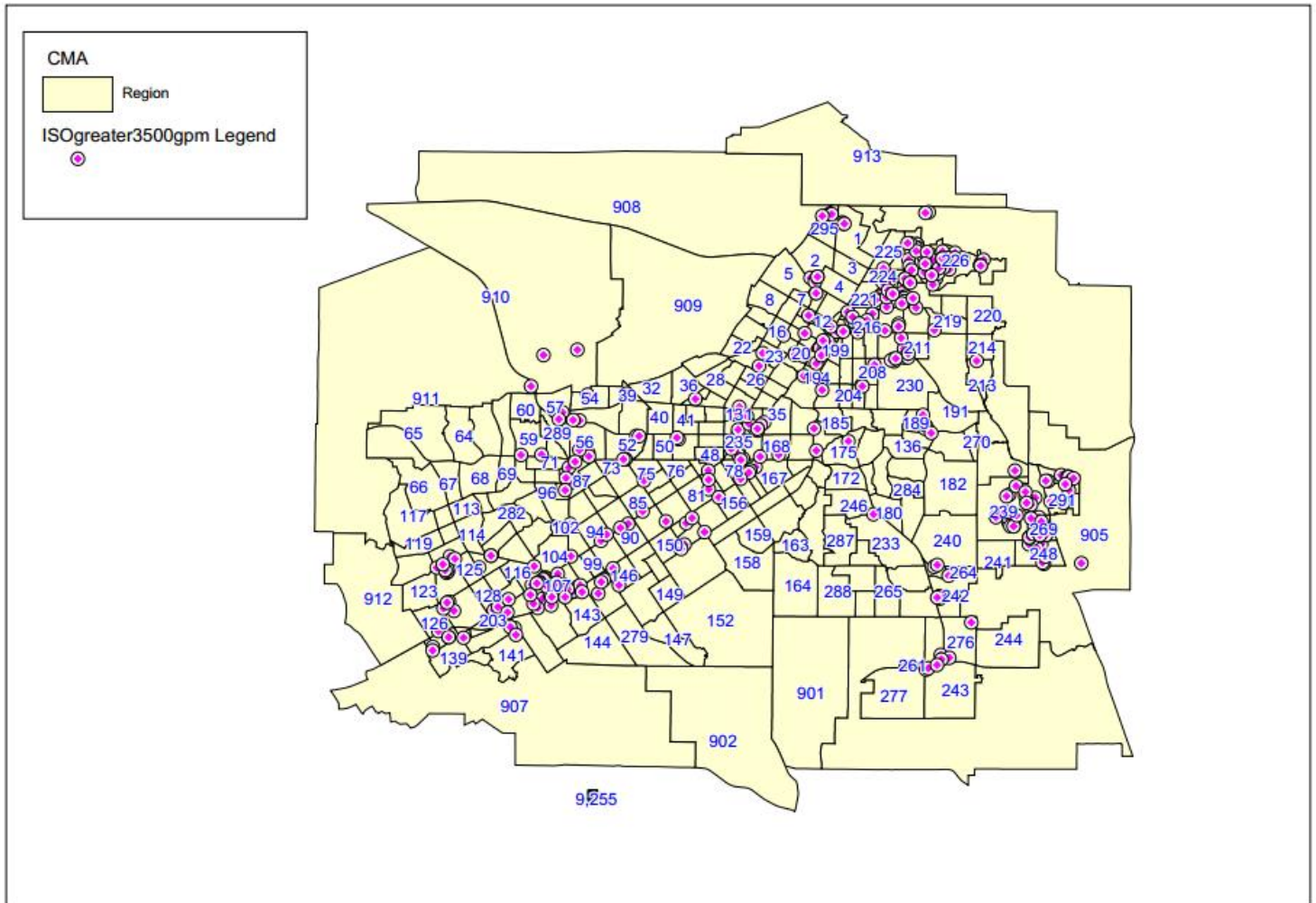
The Insurance Services Office (ISO) provides rating for cities/regions and for specific buildings based on a rating schedule. Buildings are rated primarily on fire flow requirements. Buildings with higher fire flow requirements are considered higher risk. The higher the risk, the more emergency units are needed for response. Overall risk is assigned a property protection class. The majority of RFD protection area is ISO Class 2.

The size or area of a building is a key factor in assessing risk for fires. Generally speaking, larger more complex structures carry a larger risk due to the time it takes to complete suppression activities within them. They tend to require longer hose lays, more ladders and may require equipment staging areas within the building for working crews.





# **Buildings Over 3500 GPM Needed Fire Flow (ISO Rated) by CMA**

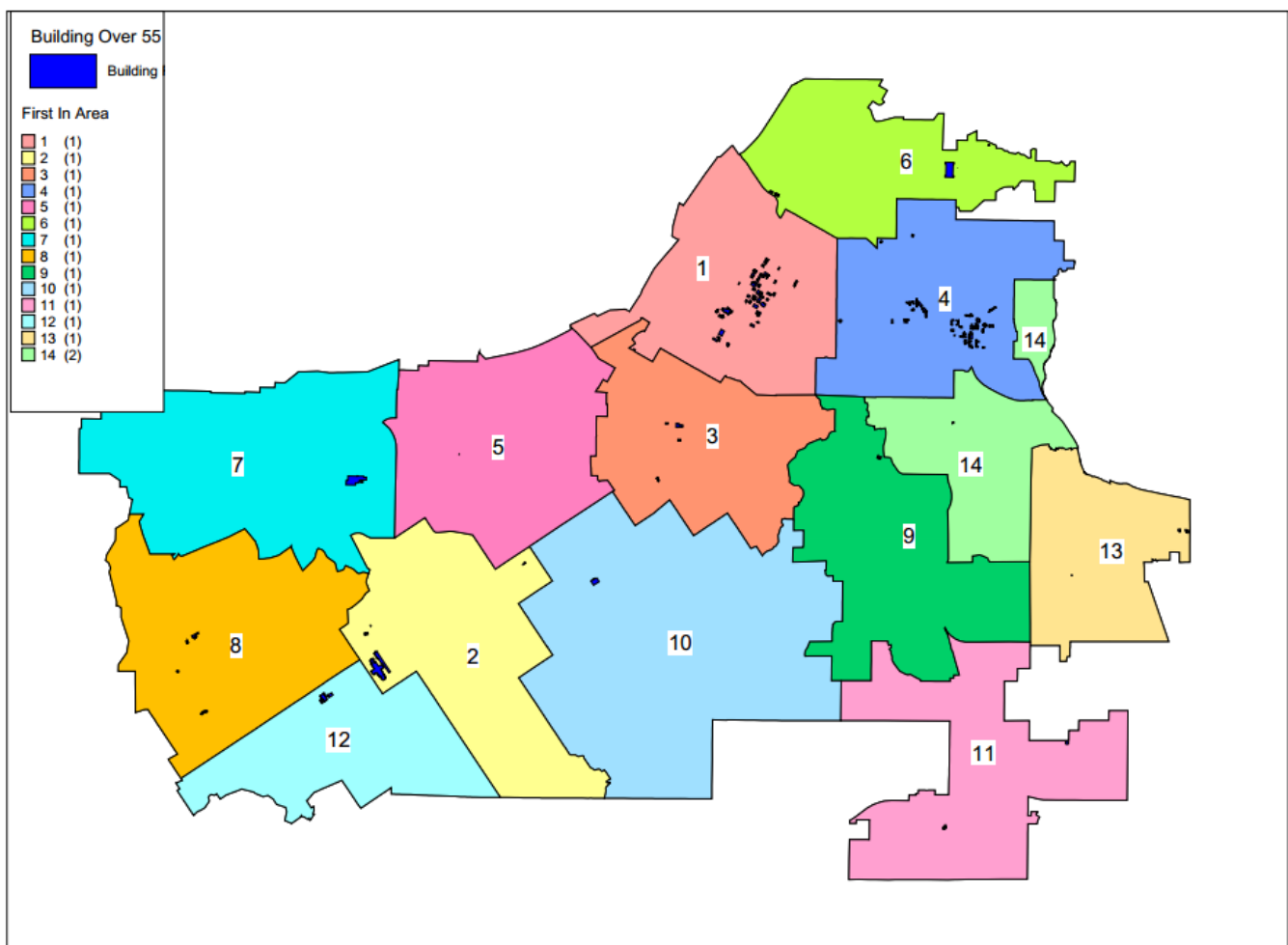


## All Risk

The height of buildings is also a factor in assessing risk for fires. There is a direct relationship between height and the equipment needed to protect the building. For example, the roof of most three-story buildings cannot be accessed with a 24-foot ladder, the standard on many RFD engine companies. A 24-foot ladder can be placed with only one person while a 35-foot ladder requires two personnel. Buildings three or more stories require an aerial ladder to access the upper floors and roof area.<sup>9</sup> There are 121 buildings over 55 feet high and 36 buildings over 75 feet.

Processes being performed within a structure can increase the risk factors significantly. If a standard commercial concrete tilt-up building is used as an office or warehouse, the risk is not significant, but if the same building is used as a woodworking shop or printing shop, an explosion potential exists. The same building using large quantities of flammable liquids or gases would change the risk factors again. Finally, changing the use by adding a large number of people such as in a church or restaurant changes the life hazard and the risk factors of the structure. What is happening in the structure is every bit as important to the overall risk assessment as the size, location and construction of the building.

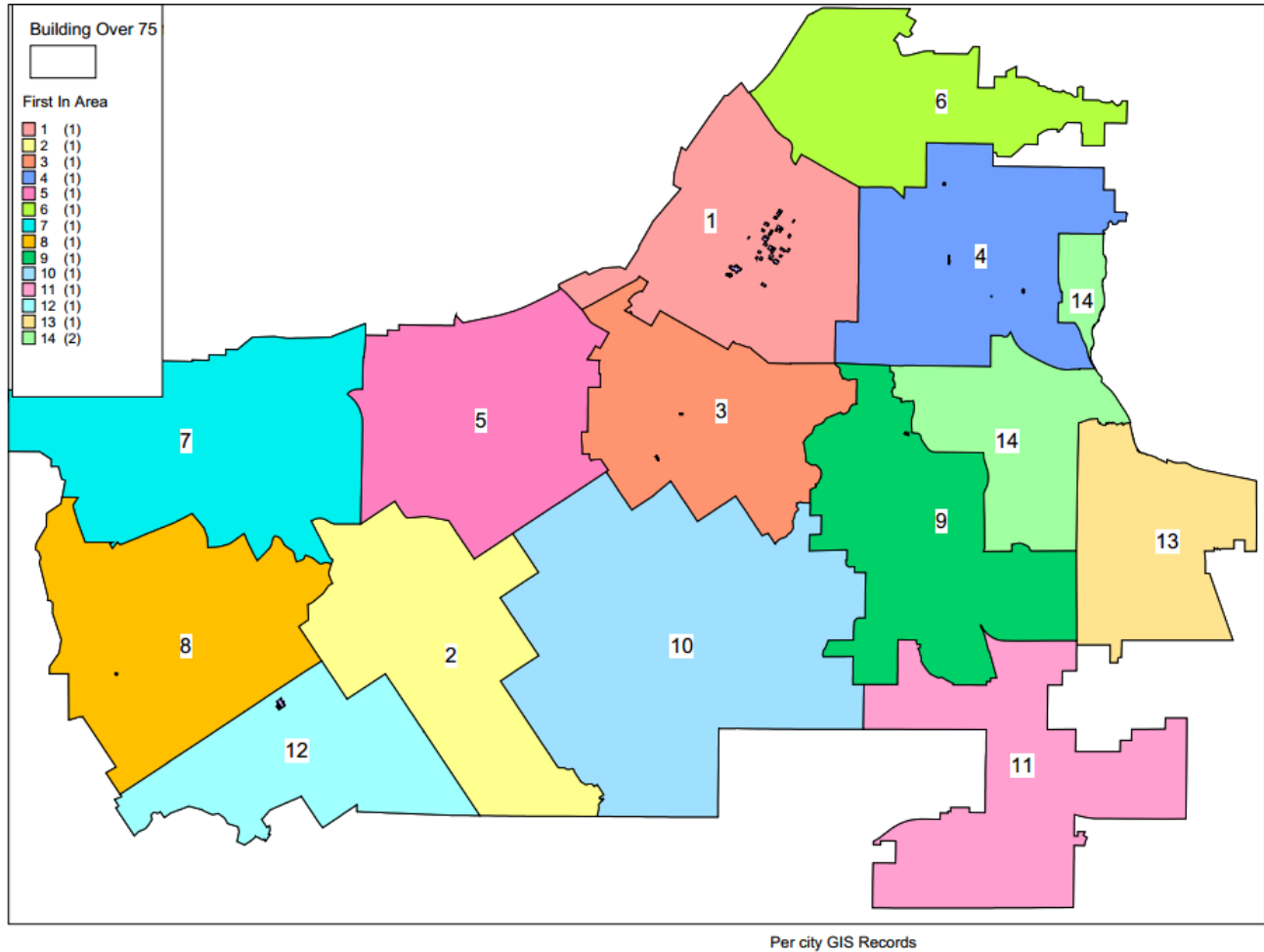
Buildings Over 55 Feet



Per city GIS Records

<sup>9</sup> High Rise Map.

### Buildings Over 75 Feet



Built-in fire protection (fire sprinklers, standpipes, etc.) is a major issue with larger structures. Built-in fire protection negates many of the concerns regarding large structures or hazardous processes. In many communities, developers and builders are given “credit” for built-in protection by allowing narrower street, longer cul-de-sacs, larger buildings and/or smaller water mains. This results in the balancing of risk and cost. While built-in fire protection should significantly reduce the spread of fire, it may not extinguish the fire. Firefighters still need to complete the extinguishment and perform ventilation, overhaul and salvage operations.

#### **Community Risk Assessment (Target Hazards)**

A comprehensive review of the service area was conducted by field units under the direction of Battalion Chief Staley. Data was gathered from ISO, fire prevention inspection records, GIS list of high rise occupancies, target hazards in CAD, economic revenues from City Finance, and interviews with city and department stakeholders. The information was then reviewed at the first due station level and information was collected on type of risk found: Need Fire Flow, Hazardous Material occupancy, Life Safety risk, High Rise, economic risk and other (historical/cultural). The map depicted below is a citywide map of all risk.<sup>10</sup>

<sup>10</sup> Please see exhibits FS1-14 Risk Maps for individual response areas.





## Hazardous Materials

A hazardous material is any substance or material capable of posing an unreasonable risk to health, safety and property. Multiple factors determine if a material is considered hazardous, including quantity, concentration, and physical or chemical characteristics. A hazardous material becomes a hazardous waste when it can no longer be used for the purpose it was originally intended.

Hazardous materials are present throughout the County. Chemicals are used in process, in transit, in storage, and in some cases disposed of illegally. RFD issues permits for hazardous materials in almost every part of the protection area.<sup>12</sup> These hazardous materials come in all sizes and risks from household hazardous waste to acutely hazardous materials. Business use, transport and/or sell thousands of different types of hazardous materials. Many processors mix materials changing the chemical properties and increasing the potential risk. The Fire Department recognizes that all facilities have the potential to carry and utilize minimal amounts of hazardous materials. About 1180 occupancies, 1200 businesses have “reportable levels” (quantities of material that require disclosure of the location, amount, and nature of the risk) of hazardous materials. 1515 Businesses qualify for the CalARP (California Accidental Release Prevention) program and 2 users are in the federal RMP (Risk Management Program). Additionally, all types and quantities of hazardous materials travel through Riverside by rail, air and truck. The hazardous materials risk is significant enough to require RFD to have a hazardous materials response team capable of Level A entry.

## Wildland Interface

Riverside County has a long history of significant wildland fires. CALFIRE is the forestry agency assigned to the unincorporated areas of Riverside County. RFD has working automatic and mutual aid agreements with CALFIRE to assist in fire protection. There are areas within the City that interface the county and other jurisdictions. Vegetation often called “chaparral” located in close proximity to development increases the risk. When a fire occurs, the weather, topography, type/nature of vegetation, access and water supply have a significant impact on severity and outcome. Large catastrophic wildland fires in Southern California are usually driven by Santa Ana winds. These dry/hot winds can blow at 60 to 100 mph and can last several days. Houses that interface with the wildland areas are at risk from burning vegetation. The weight and speed of initial attack for wildland fires is dependent on location, weather, topography and fuels. Risk areas for Riverside City are identified as:

Urban/suburban interface - Areas between the wildland and the developed areas

The nature of the interface changes with rainfall and maintenance efforts or the lack thereof. The State of California has identified areas of high risk and designated them as Very High Fire Severity Zones.<sup>13</sup> RFD will maintain the capability of responding to interface areas.

## Swiftwater

Riverside has many miles of streams, riverbed, and flood channels. Many of the streams do not flow year round, but when they do, they flow fast and dangerous. Because they do not flow all the time, people do not always take the potential of flooding into consideration. Rapid runoff in areas remote from the streambed can cause the situation in the main drainage to change rapidly trapping victims in a matter of minutes.

---

<sup>12</sup> RFD Hazardous Materials Permits

<sup>13</sup> Very High Fire Hazard Severity Zones.



## Current Deployment and Performance

### Performance Database

The Master Summary table contains all “INCIDENT” data specific to first unit information. The Master Detail table contains all “RESPONSE” data with records of every unit assigned to an incident. The following were data analysis standards:

- All call processing and turnout time > 15 minutes were deleted.
- Call processing time of 0 minutes were deleted.
- Travel time exceeding 30 minutes were deleted.
- Any time a call processing, turnout and/or travel time was deleted, the Rx to OS time was deleted as well.
- Information resulting in null values or value errors were deleted.
- Counts for all valid times are recorded.
- Majority of data errors occurred in 2015 during system conversion.

There are a total of 155,857 incident records for 2013-2017. The table below shows number of incidents by year and the percentage of types of incident call type: <sup>14</sup>

<b>Incident Summary 2013-2017</b>	<b>2017</b>	<b>2016</b>	<b>2015</b>	<b>2014</b>	<b>2013</b>	<b>% of 2017 Incidents</b>
<b>Number of All</b>	35865	35406	30774	27099	26712	
<b>Number of Core</b>	27379	26918	25409	20425	20107	76.3%
<b>Number of Structure (111, 113, 114, 120, 121)</b>	207	196	239	149	188	0.6%
<b>Number Other Fire (100, 112, 115-119, 122-199)</b>	854	762	737	537	579	2.4%
<b>Number EMS (300, 311 320, 321)</b>	24159	23727	21730	17930	17699	67.4%
<b>Number EMS TC (322-324)</b>	2061	2094	2091	1677	1506	5.7%
<b>Number Rescue (350-399)</b>	58	86	55	58	54	0.2%
<b>Number Haz Mat (410, 420-422, 430-31, 451, 471)</b>	40	53	117	66	75	0.1%

<sup>14</sup> 2016 data updates available in Exhibits 2016

## Measurement of System Performance

Deployment is generally measured using three concepts: Distribution (what and where), Concentration (how much) and Reliability (how well). These concepts will be used in the creation of performance objectives, performance measures for response times, and the determination of the agency's ability to provide an effective response force for each risk category for each service provided.

### *Distribution*

Distribution is defined as the systematic locating of geographically distributed first due resources (stations, apparatus and personnel) for all-risk initial intervention. Distribution locations, also known as “points of service delivery” are established to ensure the rapid deployment of resources to intervene in routine emergencies and bring them to a successful conclusion. For the most part, this is time and distance analysis.

The RFD distribution system is set up to provide the appropriate emergency response to the variety of risks identified in the previous section. The RFD uses an “all-risk” concept in that each first due station is equipped and staffed to provide an effective base line response.

The effectiveness of a distribution system is normally measured by the percentage of the jurisdiction covered by the first due units within adopted public policy response times. Specific performance objectives have been established for each service provided (see next chapter).

A distribution network is considered successful when it is capable of providing a resource to the scene of an emergency with the correct apparatus, equipment, and staffing to complete the following:

1. Assessment of the situation
2. Establish a plan of action capable of mitigating the emergency
3. Request for appropriate resources
4. Intervention to stop/impede the escalation of the emergency

The current distribution of resources for the RFD can be traced to a number of events throughout its history. The location and spacing of stations has been dependent on funding, land availability and infrastructure. The impacts of such events as Proposition 13, extreme growth, and economic constraints have had an impact of the placement and number of resources in the current delivery system.

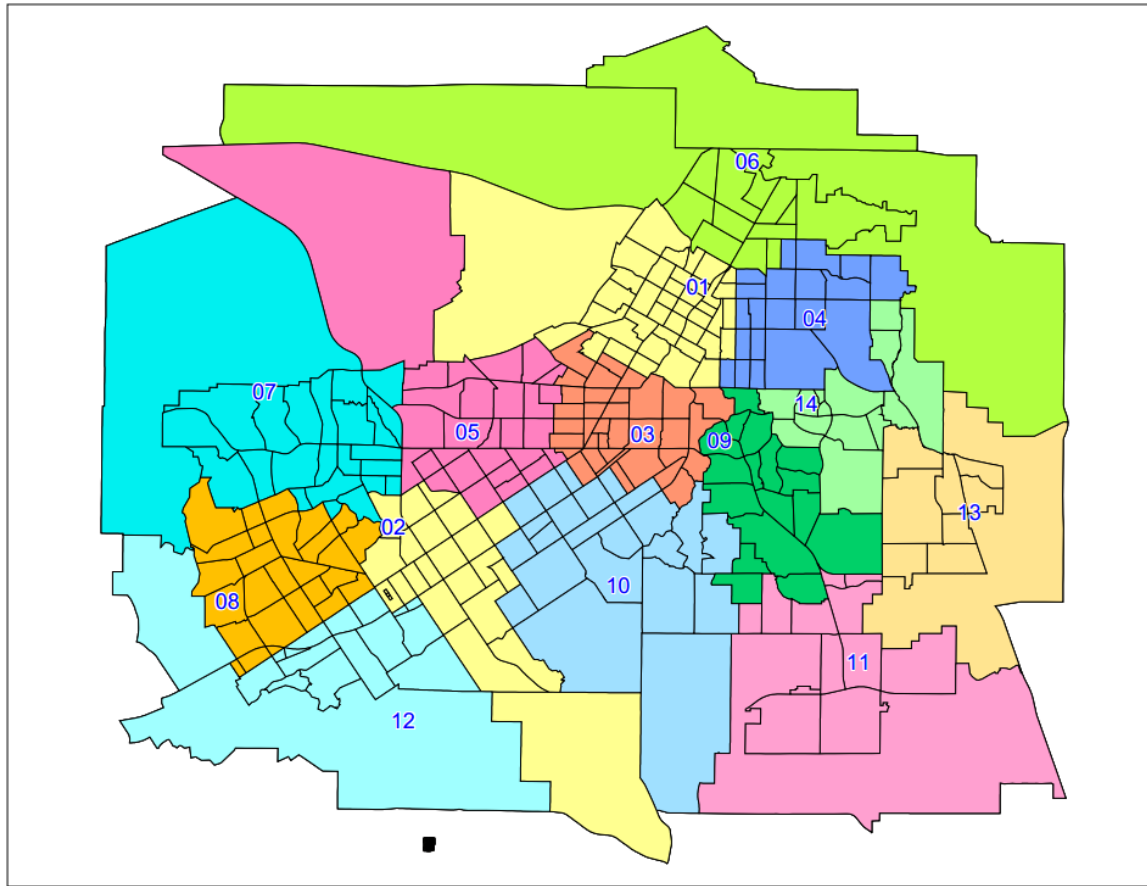
The current distribution is shown below.<sup>15</sup>

Source: RFD GIS CMA Layer

---

<sup>15</sup> Basic Distribution (First Due) Map.

**Station First In Assignments by CMA**



Distribution implies that there are certain risks that will require resources beyond that available on initial attack. The depth of coverage includes an analysis of whether sufficient resources are available within acceptable time frames to amass staffing, equipment and apparatus to deal with identified risk levels.

#### Distribution Performance Measurement

Core emergencies are those incidents that have a direct impact on the placement of fire stations and the resources in the stations. Advanced Life Support (ALS) and rescue incidents and structure fires are classified as Core Emergencies. Other types of incidents are not modeled as they do not overly effect deployment, but are a sub-set of the total workload. Incidents outside the City areas are not used for analysis. Measurement of incidents are from the Records Management Systems (RMS) data base and are reviewed based on incident type codes. Outliers are removed. The following are the group of review core calls:

- Structure Fires: 111, 113, 114, 120, 121
- Other Fires: 100, 112, 115-119, 122-199
- EMS: 300, 311, 320, 321
- EMS TCWI: 322, 323, 324
- Rescue: 350-399
  - Extricate: 350-352, 357
  - Technical Rescue: 354-356
  - Water Rescue: 360-363

Measuring the distribution system is normally accomplished using Travel Time or Total Response Time of first due company resources. Travel Time is the interval of time from the point the emergency unit begins responding to its arrival at the scene of the emergency. Total Response Time begins when the request for emergency services is received at the dispatch center and extends to the arrival of the first emergency unit at the scene of the emergency.

### Response Times (Baselines)

The rapid deployment of resources to emergencies is another distribution factor to consider. A review of Year 2017 data (27,379 core emergency incidents out of 35,865 incidents) reveals that collectively, first due companies arrive on the scene within the following percentile response:

All Core	Call_Process Time_Min	Turnout Time_Min	Travel Time_Min	RX_To_OS Time_Min
50th	0:00:17	0:01:09	0:03:23	0:05:03
70th	0:00:23	0:01:30	0:04:11	0:05:56
80th	0:00:31	0:01:43	0:04:45	0:06:34
90th	0:00:52	0:02:01	0:05:48	0:07:45

Average total response time was 5:32 minutes

### Travel Time Analysis

In 2017, 68% of the core calls in RFD protection areas were covered within a four minute or less travel time by the first unit to arrive. The average travel time to all core emergencies was 3:47 and 90% of all core emergencies have a unit arriving in 5:48 for travel time.<sup>16</sup>

All Core	Travel Time_Min
50th	0:03:23
70th	0:04:11
80th	0:04:45
90th	0:05:48

Another method of analysis for travel time in areas without historical data or to validate historical data is by mileage or distance. The Insurance Services Office (ISO) uses a calculation that assumes that fire apparatus travel at 35 mph on average. ISO calculates the travel time according to the formula:

$$T = 0.65 + 1.7D$$

Where T = the travel time in minutes

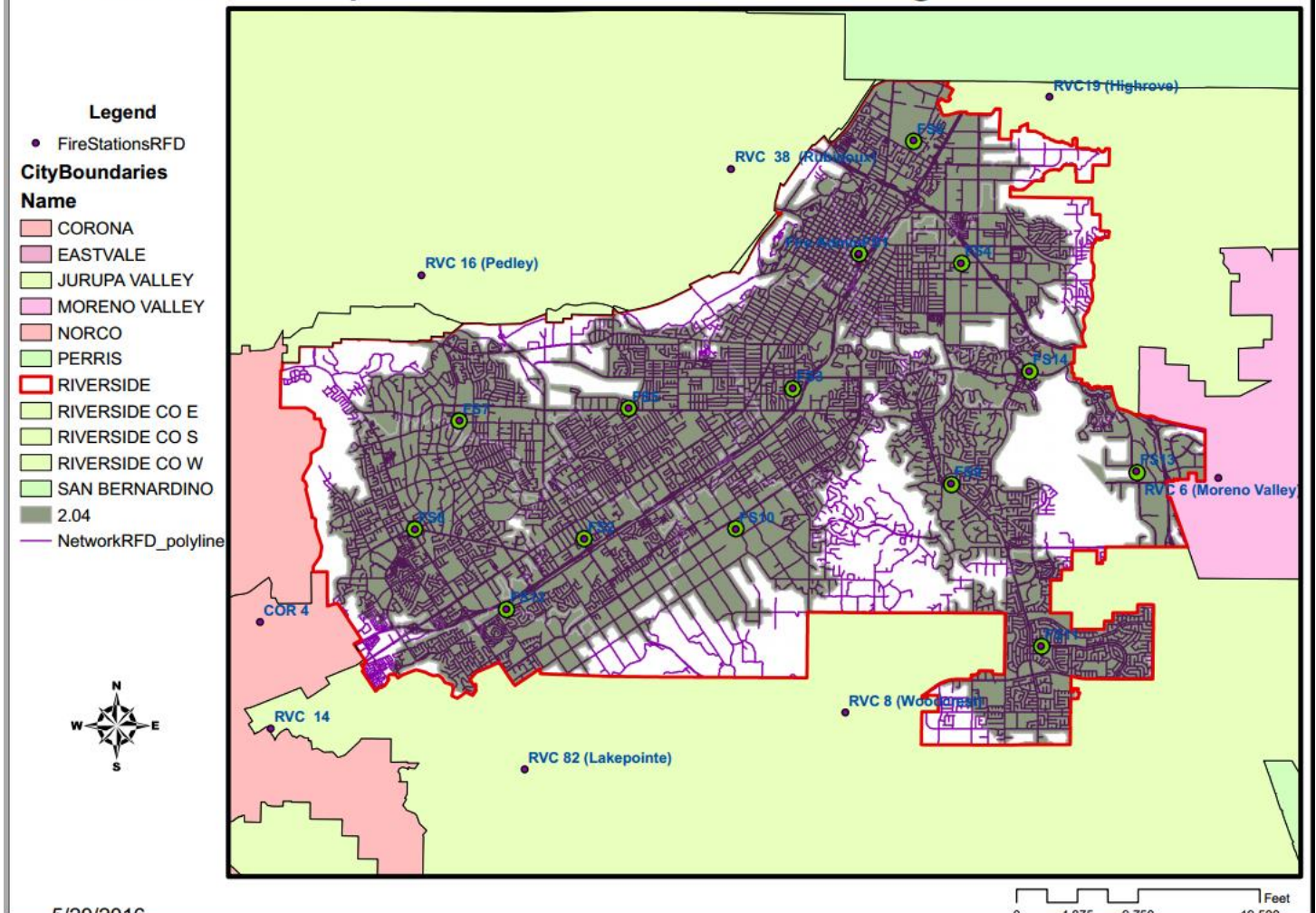
D = the distance in miles

It should be noted that ISO uses slower speeds for underpowered apparatus, terrain impacts or apparatus laying hose lines. Based on 30 mph and travel times of 4 minutes (2 miles), 5 minutes (2 ½ miles) and 6 minutes (3 miles), RFD has mapped the overall distribution coverage of stations within the protection area.<sup>17</sup>

<sup>16</sup> See Master Summary.xls

<sup>17</sup> Basic Distribution Map.

# 5 Minute Response Distribution Coverage No Mutual Aid



## Concentration

Concentration is defined as the number and spacing of resources needed to achieve an “effective response force” that can be assembled at the scene of an emergency within a defined time frame for each given risk and level of service. An effective response force is the accumulation of resources necessary to stop the escalation of the emergency and bring it to conclusion. In other words, concentration is the ability to place enough resources on a specific call to keep the event from becoming a major emergency. Concentration considers risk versus cost. Both factors are variables, thus:

### Increased Risk = Increased Concentration

Concentration can be measured in several ways. The most common approach is to measure the percentage of the community covered by an effective response force within adopted time frames. A first-alarm assignment is considered an effective response force for fire incidents.

In arriving at a concentration level for any community, the challenge is to strike a balance on how much overlap there should be between station response areas. Some overlap is necessary to maintain response times and to provide back up for distribution when first-due units are committed.

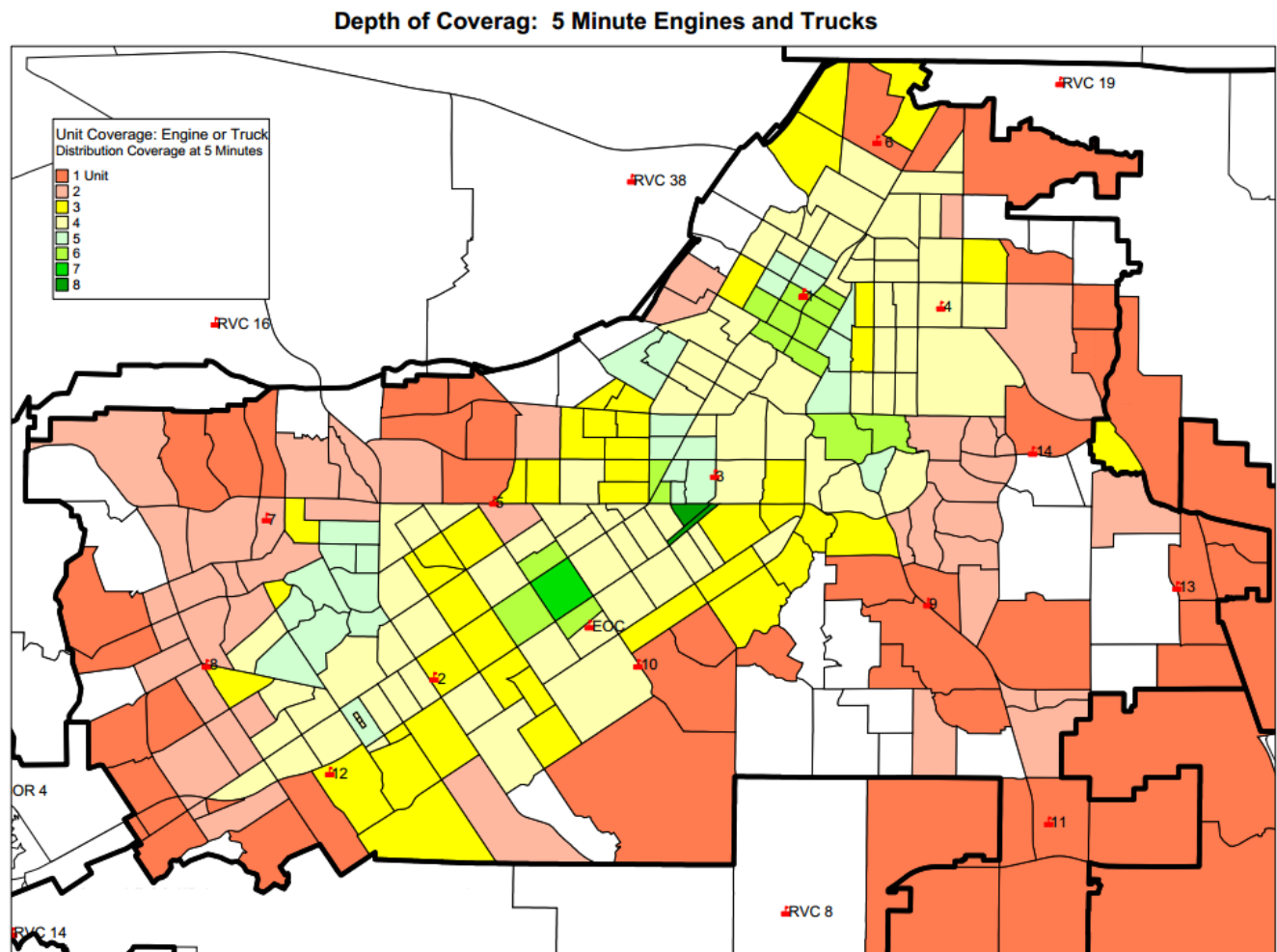


A successful concentration network means that the system is capable of providing the correct equipment, apparatus and staffing to the scene of an emergency to complete the following:

1. Stop the emergency from continuing to escalate
2. Provide for the safety and security of citizens and emergency workers
3. Complete all critical tasks in a timely manner
4. Provide for incident management

Most of the areas now served started out with limited development and very little risk. As time passed and development continued, both the population base and risk increased. The location and spacing of resources has been dependent on funding, land availability and infrastructure. Measuring the current concentration is accomplished using calls for service and the system performance of the company resources.

There were 91 structure fires in which a full effective response force arrived on scene in 2017.



## Current Performance – 2017 Data<sup>18</sup>

### Fire Risk

The RFD, in assessing all of the factors, has determined that the following levels should be established to identify the fire risk in each geographic area:

Low - Areas with mobile property, outbuildings, structures with less than 1,000 gpm needed fire flow.

- Low response is a single unit response

Moderate - Areas with single occupancy structures with needed fire flow requirement from 1,000 to 3,500 gpm.

**Structure Fire Assignments**

	1st Alarm	2nd Alarm	3rd Alarm	4th Alarm	5th Alarm
Eng	3	5	7	9	11
Truck	1	2	2	2	2
Squad	1	1	1	1	1
BC	1	2	2	2	2
Total FF	15	26	34	42	50

High - Areas with multi-occupancy structures with needed fire flow above 3,500 gpm, structures over three stories in height.

STR FIRE 2017	Call_Process Time	Turnout Time	Travel Time	RX_To_OS Time
50th	0:00:20	0:01:04	0:03:40	0:05:14
70th	0:00:26	0:01:39	0:04:18	0:06:14
80th	0:00:31	0:01:54	0:04:48	0:06:35
90th	0:00:58	0:02:10	0:05:29	0:07:17
Count	207	207	207	207

### Medical Risk

RFD responded to 35,865 incidents in 2017. More than 70% are medical calls for service. Even more calls have a medical component (traffic accident is a rescue but will likely have injured victims). The high percentage of medical calls makes the medical risk a high probability for occurrence throughout the service area.

The RFD, in assessing all of the factors, has determined that the following levels should be established to identify the medical risk in each geographic area:

Low - Areas with a history or potential for emergency incidents for predominately Basic Life Support level of care was provided. Calls requiring basic first aid / EMT-1 level skills.

---

<sup>18</sup> See individual baseline graphs for each risk which contain 2013-2017 data in attachments

These areas normally have low population densities and/or limited residential or commercial development.

- Low response is a single unit response

Moderate - Areas with a history or potential for emergency incidents where Paramedic or Advance Life Support level of care was routinely provided. Call locations that require the full scope and depth of the Emergency Medical System. This is the majority of the protection area.

- Moderate EMS response is a single unit (Eng, Trk or Squad) with AMR ambulance

EMS 2017	Call_Process Time	Turnout Time	Travel Time	RX_To_OS Time
50th	0:00:16	0:01:09	0:03:22	0:05:00
70th	0:00:23	0:01:29	0:04:09	0:05:52
80th	0:00:30	0:01:42	0:04:41	0:06:28
90th	0:00:50	0:01:59	0:05:40	0:07:35
Count	24159	24159	24159	24159

High - Areas with a history or potential for needing multiple Paramedic Level responses simultaneously. These areas would normally have high population densities and/or large numbers of “at risk” populations. High also includes: Disasters and Mass Casualty Incidents.

Multi Victim EMS High		
Eng.	2	
Truck	1	
Squad	1	2 Amb.
BC	1	
Total FF	12	

## **Rescue Risk – EMS/Traffic Collision and Technical Rescue**

### **EMS/Traffic Collision**

RFD protects a large area with many freeways, rail lines, waterways and commercial/industrial areas. The need for rescue services is great. There is the risk associated with transportation accidents, industrial accidents and construction accidents. The RFD, in assessing all of the factors, has determined that the following levels should be established in determining the risk for rescue emergencies in each geographic area:

Low - Areas with a history or potential for rescue situations that require only the tools and knowledge set available on first due apparatus. Examples include: Traffic Accidents, persons needing assistance up or down an elevation difference where simple solutions such as a rope or ladder will complete the rescue.

- Low response is a single unit response

EMS TC 2017	Call_Process Time	Turnout Time	Travel Time	RX_To_OS Time
50th	0:00:18	0:01:17	0:03:32	0:05:20
70th	0:00:27	0:01:40	0:04:31	0:06:27
80th	0:00:37	0:01:50	0:05:18	0:07:13
90th	0:01:11	0:02:07	0:06:36	0:08:35
Count	2061	2061	2061	2061

Moderate - Areas with a history or potential for rescue situations requiring the use of specialty equipment available on all RFD truck companies. Examples include: traffic accidents with persons trapped, and persons unable to walk or assist themselves up and/or down an elevation. Core incidents are Traffic Accidents.

Rescue Assignments		
	Rescue/ No Medical/ or TC-Moderate	Rescue-EMS- High
Eng.	1	2
Truck	1	1
Brush Truck		
BC	1	1
Total FF	7	10

### **Technical Rescue Risk**

High - Areas with a history or potential for rescue calls requiring specialized equipment and training. Examples include: technical rescues of persons trapped by equipment, buildings or earth that will require extended and complex rescue solutions. Included are special incidents due to disaster responses to earthquakes, floods, landslides, hurricanes or tornados and other situations where large numbers of people are at risk.

Tech Rescue 2017	Call_Process Time	Turnout Time	Travel Time	RX_To_OS Time
50th	0:00:20	0:01:11	0:04:41	0:05:13
70th	0:00:30	0:01:24	0:05:53	0:06:27
80th	0:00:34	0:01:33	0:06:49	0:07:31
90th	0:00:49	0:01:43	0:08:15	0:08:47
Count	58	58	58	58

### **Hazardous Materials Risk**

The RFD, in assessing all of the factors, has determined that the following levels should be established in determining the risk for hazardous materials emergencies in each geographic area:

Low - Areas with hazards that would require Level D entry. Incidents that require only the tools and knowledge set available on first due apparatus. These risks include incidents related to common chemicals such as those used in the home or business.

- Low response, a single unit response

Moderate - Areas with hazards that would require Level B or C entry. Incidents that require specialized tools and knowledge to deal with hazardous materials that are normally in a liquid or solid state, without acute hazards. These risks include incidents related to chemicals used in light industry, and significant amounts of hazardous materials in transport or storage.

**Hazardous Materials Assignments**

	Hazmat Mod	Hazmat High
Eng.	2	2
Truck	1	2
Squad		1
BC	1	1
Total FF	10	15

HazMat 2017	Call_Process Time	Turnout Time	Travel Time	RX_To_OS Time
50th	0:00:29	0:01:24	0:04:04	0:05:59
70th	0:01:06	0:01:43	0:06:17	0:08:30
80th	0:01:52	0:01:56	0:08:10	0:09:56
90th	0:02:24	0:02:10	0:08:42	0:12:11
Count	40	40	40	40

High - Areas with hazards that would require Level A entry. “Acutely Hazardous” materials incidents that require encapsulation of the workers and multiple specialized teams with a level of decontamination that is potentially hazardous. These include Weapons of Mass Destruction or terrorist acts.

### **Other Fire Risk**

Other fires consist of vehicle, trash, bar-b-que, fence and other small fires. They are 2.4% of all incidents measured.

- Low response is a single unit response

Other Fires 2017	Call_Process Time	Turnout Time	Travel Time	RX_To_OS Time
50th	0:00:20	0:01:18	0:03:47	0:05:46
70th	0:00:32	0:01:44	0:05:01	0:06:56
80th	0:00:47	0:01:57	0:05:43	0:07:48
90th	0:01:31	0:02:17	0:07:12	0:09:23
Count	854	854	854	854

Moderate or High risk responses are Trains or Buses and few if any calls are received.



## Wildland Interface

The nature of the interface changes with rainfall and maintenance efforts or the lack thereof. The State of California has identified areas of high risk and designated them as Very High Fire Severity Zones.<sup>19</sup> RFD will maintain the capability of responding to interface areas, however, measurements of first in unit are contained in “other fire risk”.

**Vegetation Fire Assignments**

	1st Alarm	2nd Alarm	3rd Alarm	4th Alarm	5th Alarm
Eng.	2	4	6	8	10
Truck					
Brush Truck	1	2	2	2	2
BC	1	2	2	2	2
Total FF	11	23	31	39	47

## Swiftwater

The RFD, in assessing all of the factors, has determined that the agency will maintain a swiftwater rescue program, however, response workload is low and there is not a dataset.<sup>20</sup> Initial response is:

- 1 Engine, 1 Truck, 1 Battalion Chief

## Calls for Service

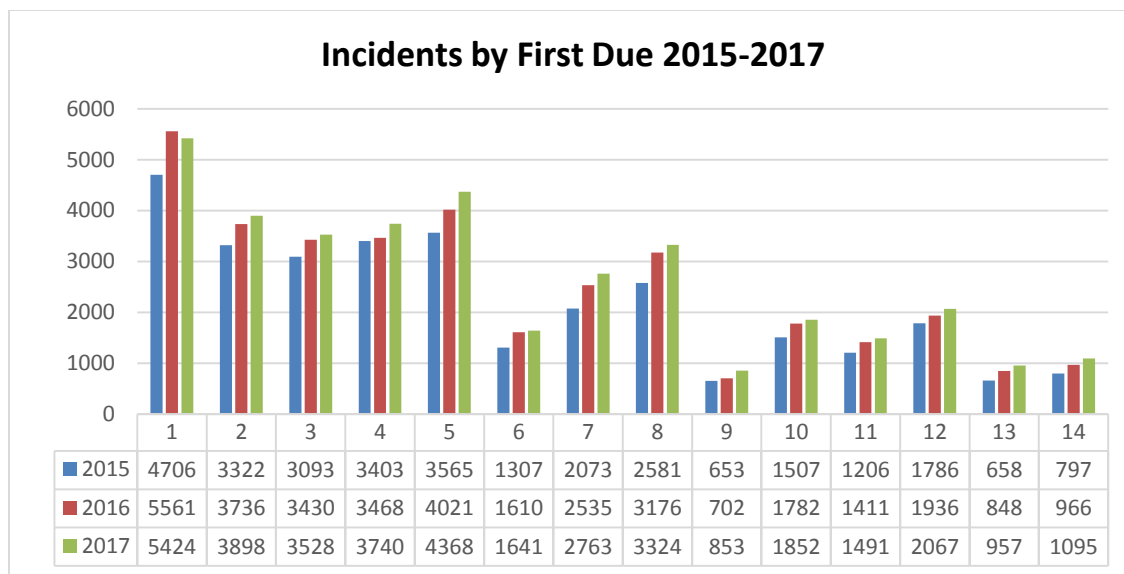
Call volume affects the amount of time a company is available to respond to emergencies within its respective first due area. Under optimal conditions when stations are properly located, the call volume distribution should be evenly divided. The impacts of call queuing and commitment times are discussed later in this section under the Reliability heading. This discussion on concentration focuses on basic workload issues. Incident locations are spread relatively even throughout the developed area of the RFD jurisdiction.<sup>21</sup>

---

<sup>19</sup> Very High Fire Hazard Severity Zones.

<sup>20</sup> See full 3 years data Baseline Charts in Exhibits

<sup>21</sup> Incidents by first due



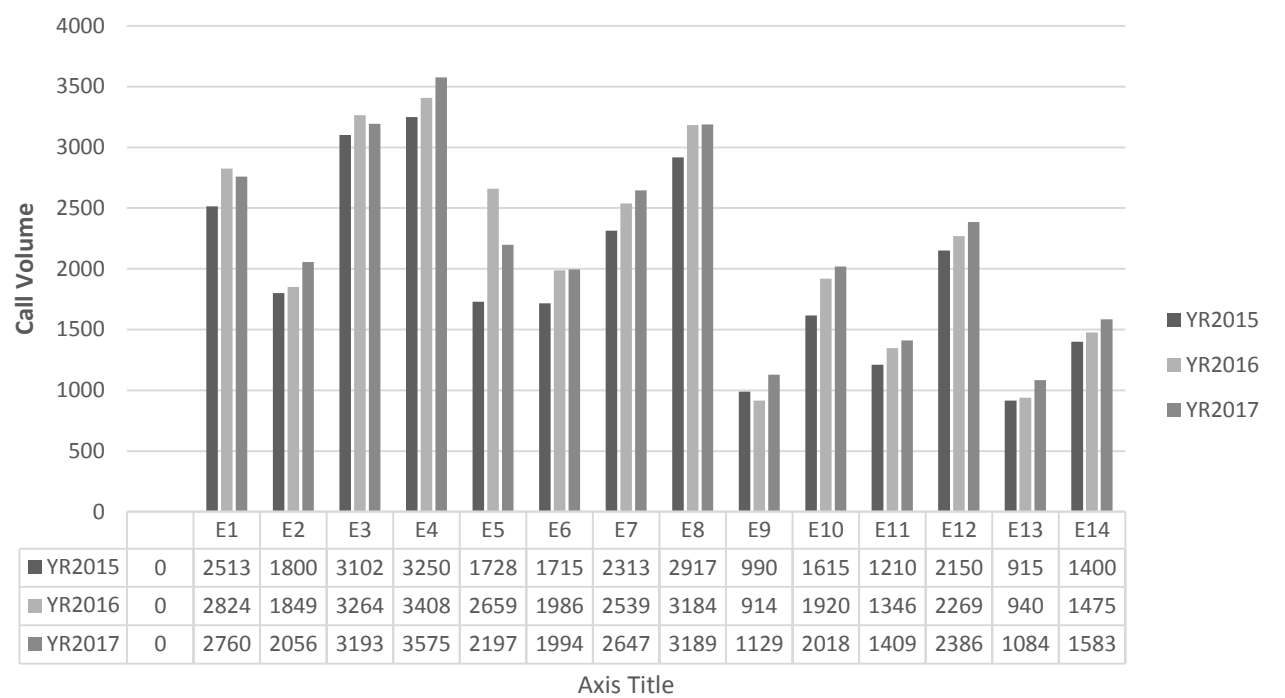
### *Unit Workload*

The most important workload indicator is the number of responses per unit. The top six busiest units account for approximately 46% of the total responses (Engine, Truck, Squad only).<sup>22</sup> The amount of time units are unavailable is a key factor in analyzing Concentration and Reliability.

One final workload issue is the number of calls that a unit services within its own first due area versus the number it responds to outside of its first due area. There are three reasons for responses outside of the first due area; 1) Concurrent calls in adjoining areas, 2) Calls requiring multiple units, and 3) Specialty unit capabilities that take the unit out of its primary first due to provide services to the larger area. It should be noted that fire, rescue and paramedic calls routinely require adjacent units. This will be discussed further in this section under Reliability.

<sup>22</sup> Responses by Unit.

Responses by Engine Company



## Response Reliability

Response reliability deals with the delivery system's ability to meet stated or desired performance objectives, response time goals, and performance measures. Historical performance and system reliability are the two key components of this measurement. A key indicator in the analysis of performance is the ability of first due companies to service their own first due area. Evaluation of historical performance is evaluated in the next chapter.

In 2017 there were 10,434 incidents where a unit other than the first due company(s) arrived first. The chart below indicates the percent of the calls in each first due area that a unit other than a first unit arrived first.

1st In Area	% Unavailable in 1 <sup>st</sup> Due
1	12%
2	12%
3	17%
4	30%
5	17%
6	38%
7	33%
8	32%
9	22%
10	28%
11	24%
12	28%
13	35%
14	28%

## Evaluation of Current Deployment

### Performance Objectives

The RFD has developed objectives for each of the major services it provides; fire suppression, emergency medical services (EMS), rescue, and special hazards. These performance objectives further define the quality and quantity of service to be provided.

#### Fire

*For all fire incidents, RFD shall arrive in a timely manner with sufficient resources to stop the escalation of the fire and keep the fire to the area of involvement upon arrival. Initial response resources shall be capable of containing the fire, rescuing at-risk victims and performing salvage operations, while providing for the safety of the responders and general public.*

#### EMS

*For all emergency medical incidents, RFD shall arrive in a timely manner with sufficient trained and equipped personnel to provide medical services that will stabilize the situation, provide care and support to the victim and reduce, reverse or eliminate the conditions that have caused the emergency while providing for the safety of the responders. When warranted, timely transportation of victim(s) to appropriate medical facilities shall be accomplished in an effective and efficient manner.*

**Rescue and EMS/Traffic Collision with Extrication**

*For all incidents where rescue of victims is required, RFD shall arrive in a timely manner with sufficient resources to stabilize the situation and extricate the victim(s) from the emergency situation or location without causing further harm to the victim, responders, public and the environment.*

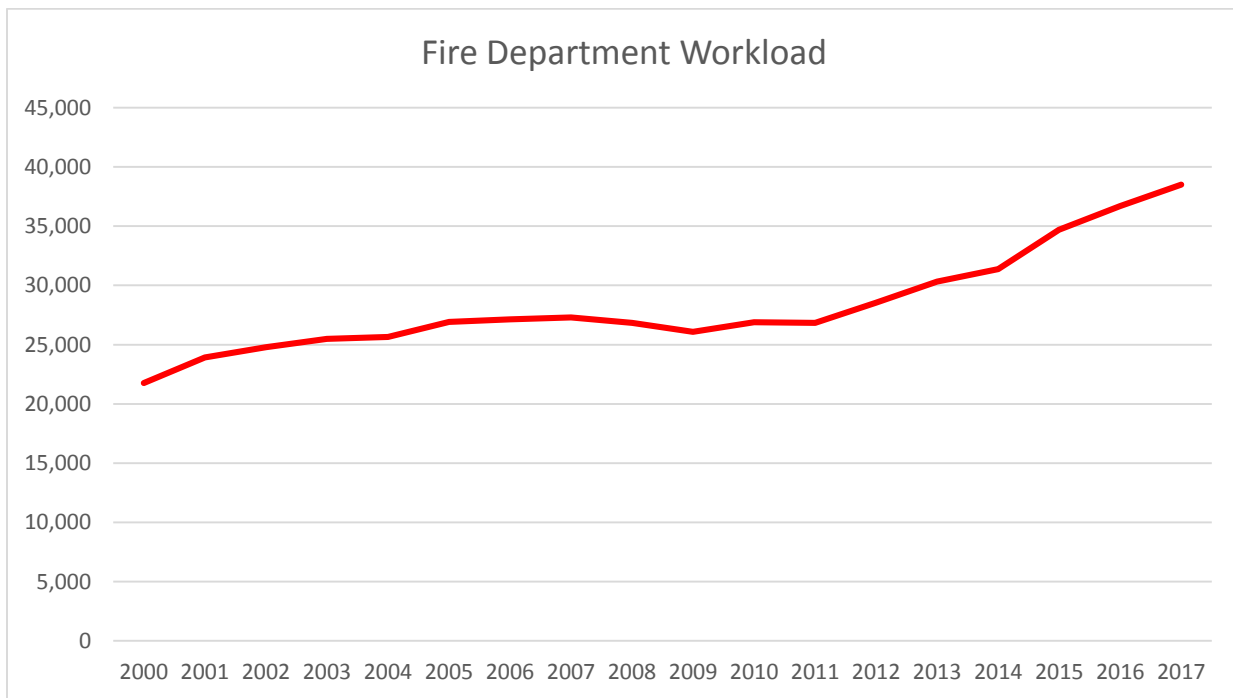
**Special Hazards**

*For all special hazards such as Hazardous Materials and Swiftwater, RFD shall arrive in a timely manner with sufficient resources to stabilize the situation, stop the escalation of the incident, contain the hazard where applicable and establish an action plan for the successful conclusion of the incident while providing for the safety and security of the responders, public and the environment.*



## Historical Response Effectiveness

The first step in reviewing response effectiveness is to determine the level of performance in the existing delivery system. If the current deployment is supposed to answer calls within x minutes, y percent of the time, does it? If not, why? There can be several reasons for performance that is below expectations. Call stacking or queuing is one of the most common. Other problems may include traffic, street design, dispatch times, turnout times, etc. All these issues effect performance and need to be measured and analyzed. If, for example, the service areas have trouble with rush-hour traffic, complicated by raised center medians and/or blind intersections, traffic signal pre-emption could be a solution. While unit workload was discussed earlier, it is also necessary to look at system workloads to get an understanding of the impacts on the service delivery. Call workload tends to be distributed evenly on a system wide basis with pockets of greater intensity.<sup>23</sup> The trend follows the population density for the most part, particularly considering the age risk factors discussed earlier under demographics. The following chart illustrates the 17-year historical call volume for the RFD.



When call volume is examined by the time of day, it shows call volume increases rapidly in the morning and remains high until the late evening with little variation.<sup>24</sup> There is some relief in call volume on weekends but not significant at the system level.<sup>25</sup> Finally, when viewed by month of year, little variance exists.<sup>26</sup> In conclusion, system demand is relatively constant with higher demand between 0700 to 1900 hours. The lowest system demand point occurs at 0500.

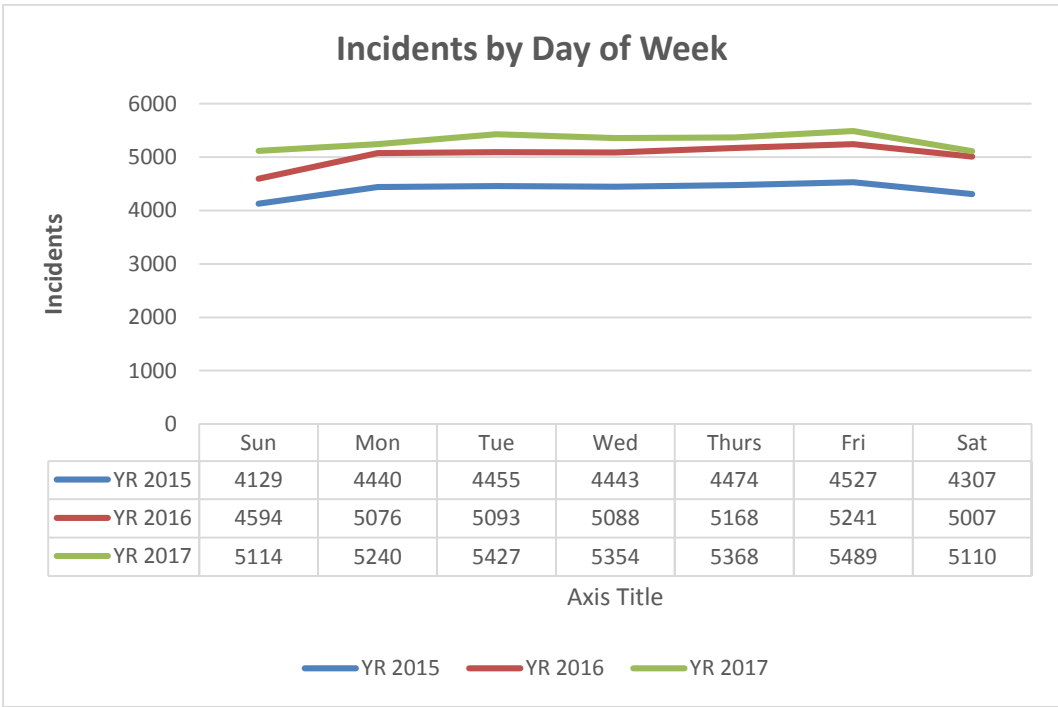
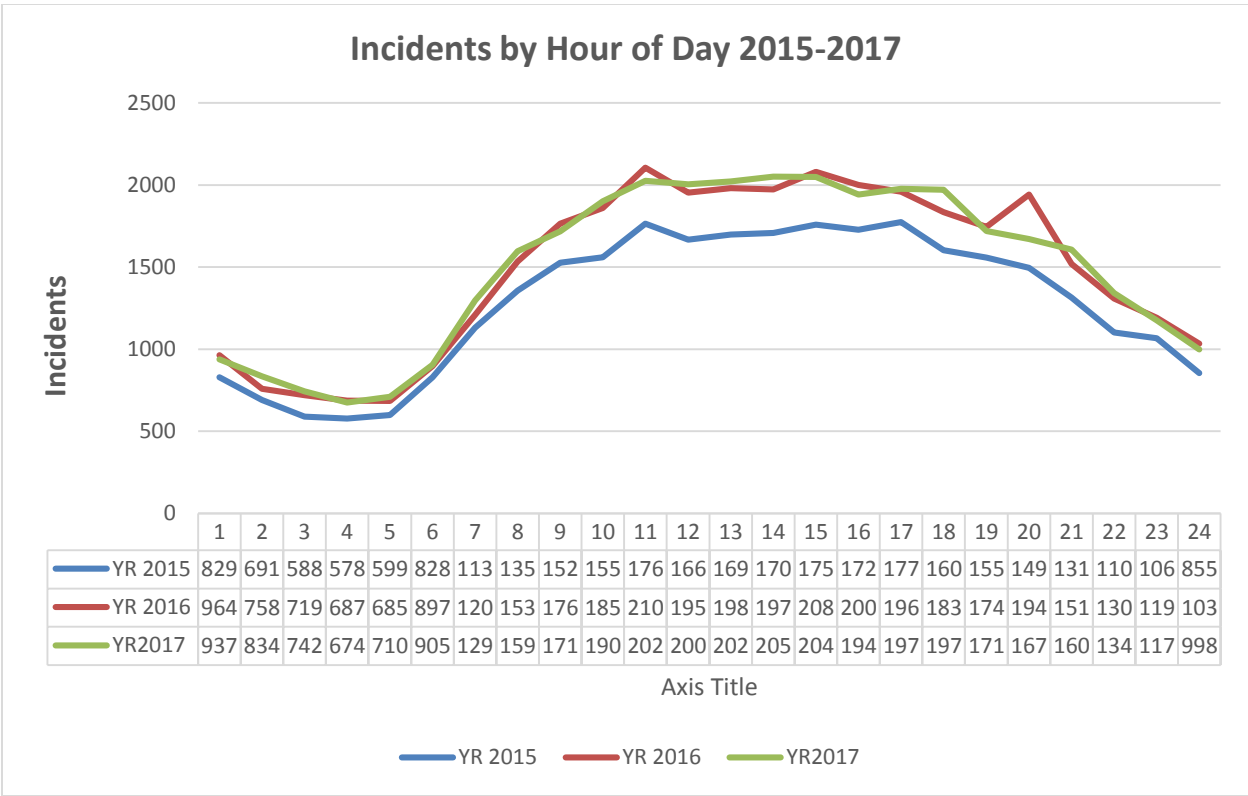
---

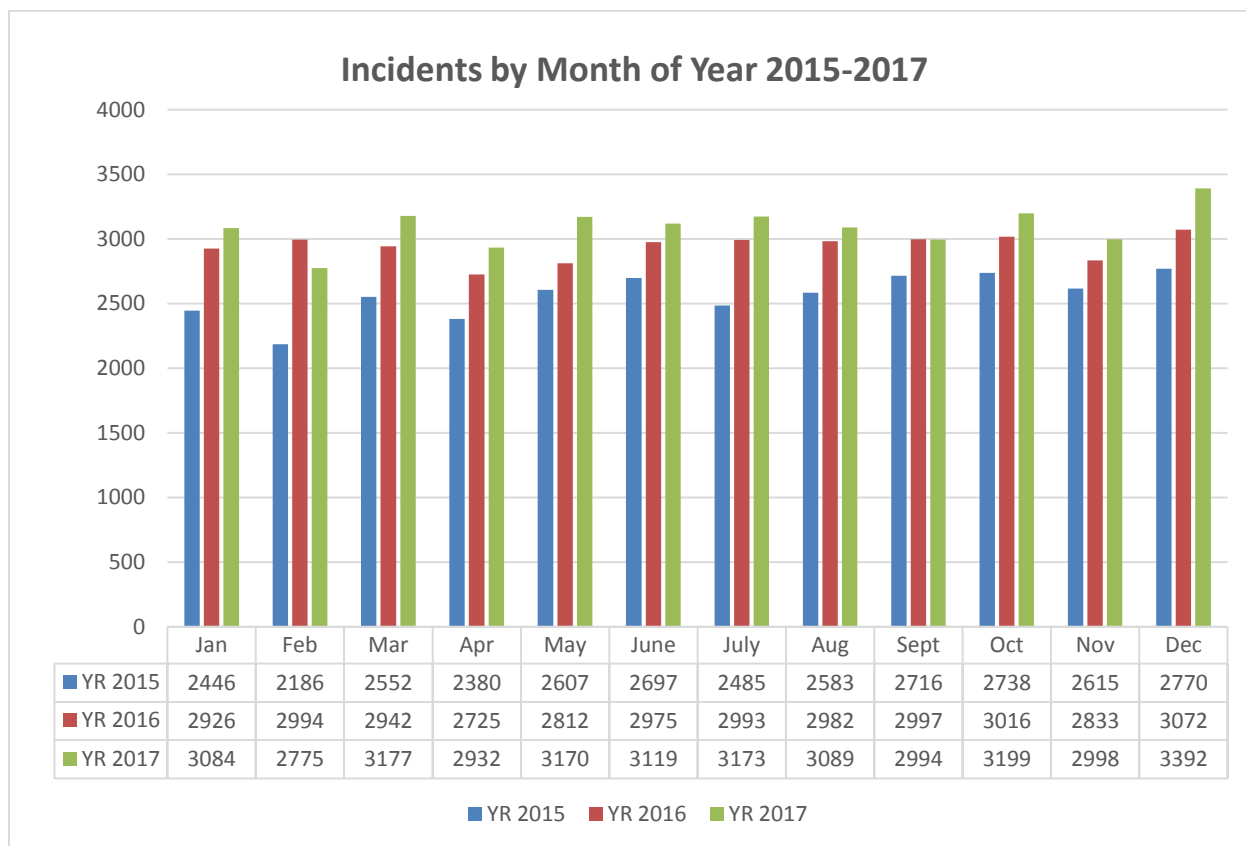
<sup>23</sup> Total Workloads.

<sup>24</sup> Time of Day Analysis.

<sup>25</sup> Calls by Hour/Day of Week.

<sup>26</sup> Calls by Month.





## Analysis of Historical Data

### Workload:

In review of workload, there is a systematic increase in incidents over time. Over 17 years there was a 43% increase in calls, with the last 3 years increasing 10%.

### Day of Week:

Insignificant change between days with the slowest day being Sunday.

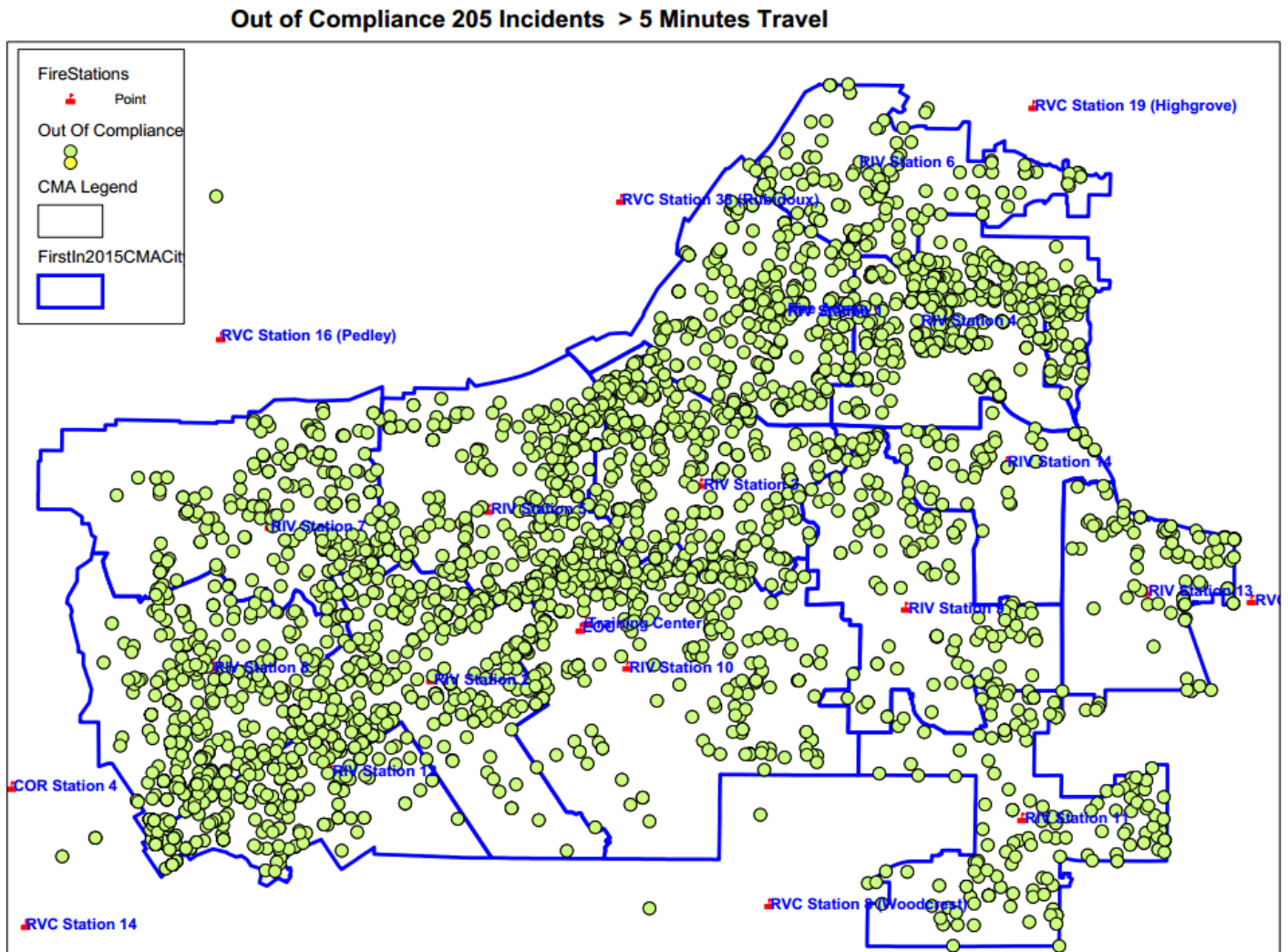
### Month of Year:

No significant change between months (Feb shows less, but has less days)

### Hour of Day:

The hour of day shows possibilities for deployment adjustment. The peak activity starts at 7 am and starts to decline at 8 pm. See summary of findings.

There is not a concentrated area of out of compliance incident locations. They are spread out among the stations and CMA's as depicted below. (Also available by CMA.)



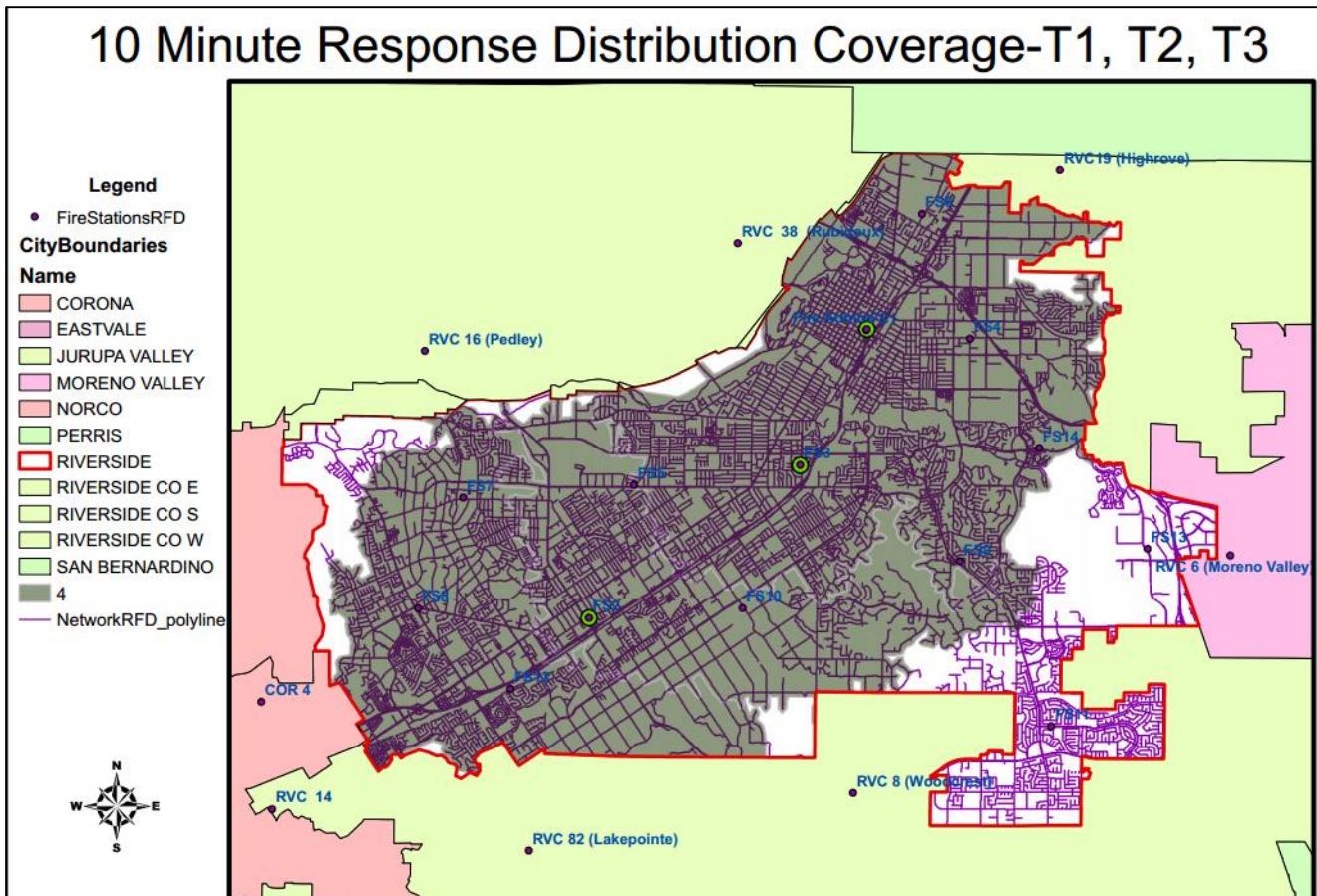
## Coverage

Coverage of the city is concentrated on the main freeway corridor/downtown area. Engine coverage has gaps between FS 9 and 10, and at the peripheral of the city. Truck placement has large gaps of coverage in the FS07, FS11, and FS13 areas; however, with the units available, trucks are placed strategically for risk and call load coverage. Similarly, Squad coverage serves only the downtown, freeway corridor with adequate coverage, and little overlap outside of the central area.

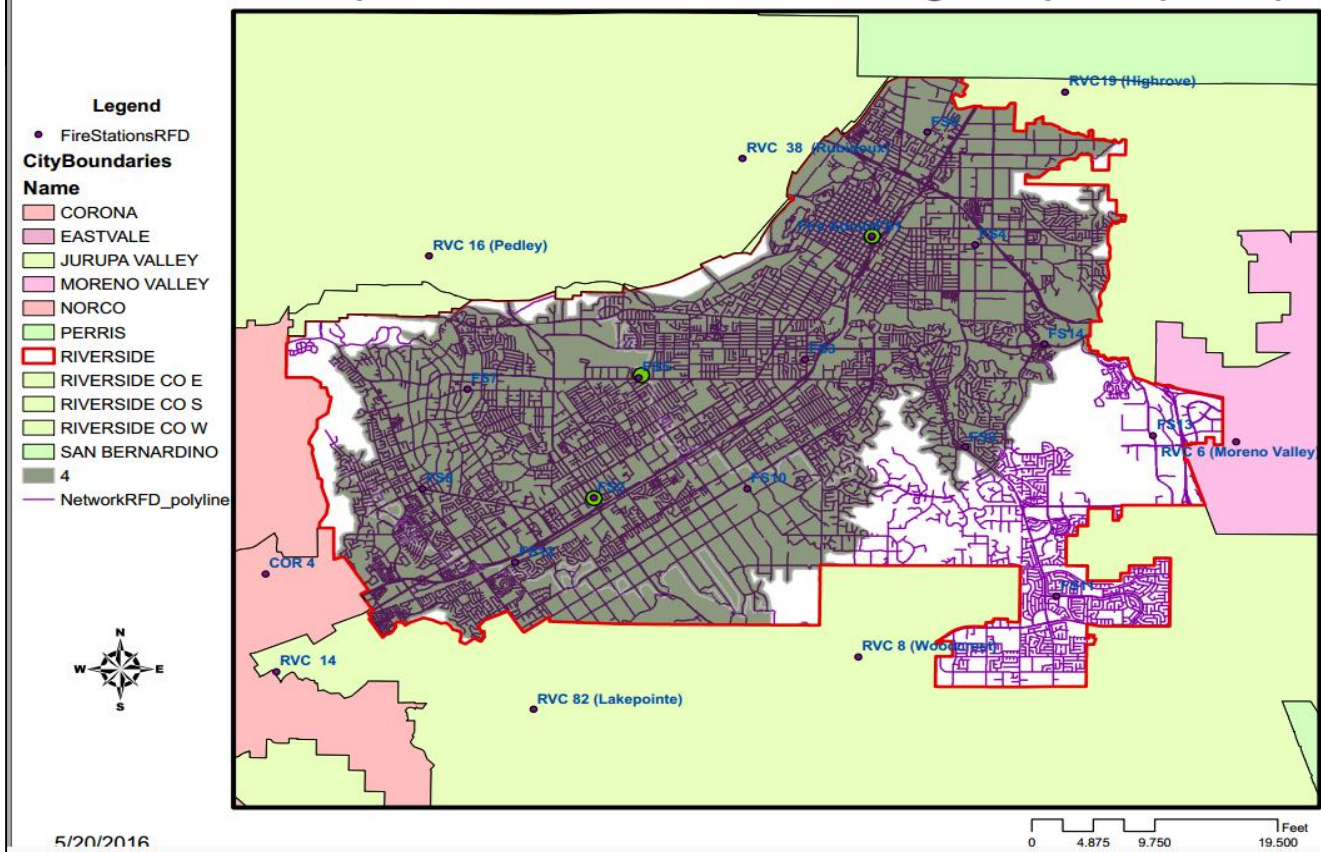
Overall conclusion is that the city is minimally staffed, and would benefit from additional truck/squad placement on the southeast area of the city.



# 10 Minute Response Distribution Coverage-T1, T2, T3



# 10 Minute Response Distribution Coverage-Sq1, Sq2, Sq5



## Response Times

### Call Processing

Call processing is a function of the Riverside Police Department 9-1-1 center. The Fire Department is a partner with AMR in providing ALS for EMS or Rescue incidents and has good relations and input, but does not have full control of the decision making for processing Emergency Medical Dispatch procedures. To resolve some extended call processing issues, the department has implemented negative reporting on a quarterly basis where the chief officers can review with the dispatch staff the delays. This process was implemented in mid-2016.

NFPA 1710 2016 edition calls for call processing to be at 90 seconds or less 90% of the time and 120 seconds or less 99% of the time. Call Processing times have improved over the last few years.

### Turnout Time

Turnout time is higher than national standards. To resolve some extended turnout issues, the department has implemented negative reporting on a quarterly basis where the Battalion Chiefs can review with station the delays. This process was implemented in mid-2016.

NFPA 1710 2016 edition calls for turnout time to be 80 seconds or less 90% of the time for fires and special operations, and 60 seconds or less 90% of the time for EMS.

### Travel Time

Travel time is at 5 minutes 48 seconds for the first due unit to all core calls 90% of the time. Many of the southern California cities strive for 5 minutes, but over the past 10-20 years have found it hard to maintain this time measure. Traffic, development, and workload have increased the time to incidents. Riverside Fire Department's goal is to plan for, and work towards, a consistent 5 minute travel time for 90% compliance. In addition, RFD supports implementing fire prevention and education solutions to aid in fire suppression and medical alternatives. Supporting infrastructure improvements, reviewing new development, and aiding interagency community services are also goals for improved services.

NFPA 1710 2016 edition calls for travel time to be at 240 seconds or less 90% of the time and ERF travel time to be 480 seconds or less 90% of the time. This concept is an NFPA standard that is not routinely met, nor will the fire department make it a goal. The department was built based on city growth, funding, and street network. Decisions made in the past improved service, and for the most part, the community and community leaders believe the current service is acceptable. (See Stakeholder input) *Maintaining current service and improving service in areas that are less served* than others are the current department goals.

### Total Response Time/Receipt to On Scene

Current 90% performance for core calls (2017) is 7 minutes 45 seconds. Improvement in the areas of Call Processing and Turnout has significantly decreased the total response time over the last few years.



## Response Time Goals (Benchmarks)

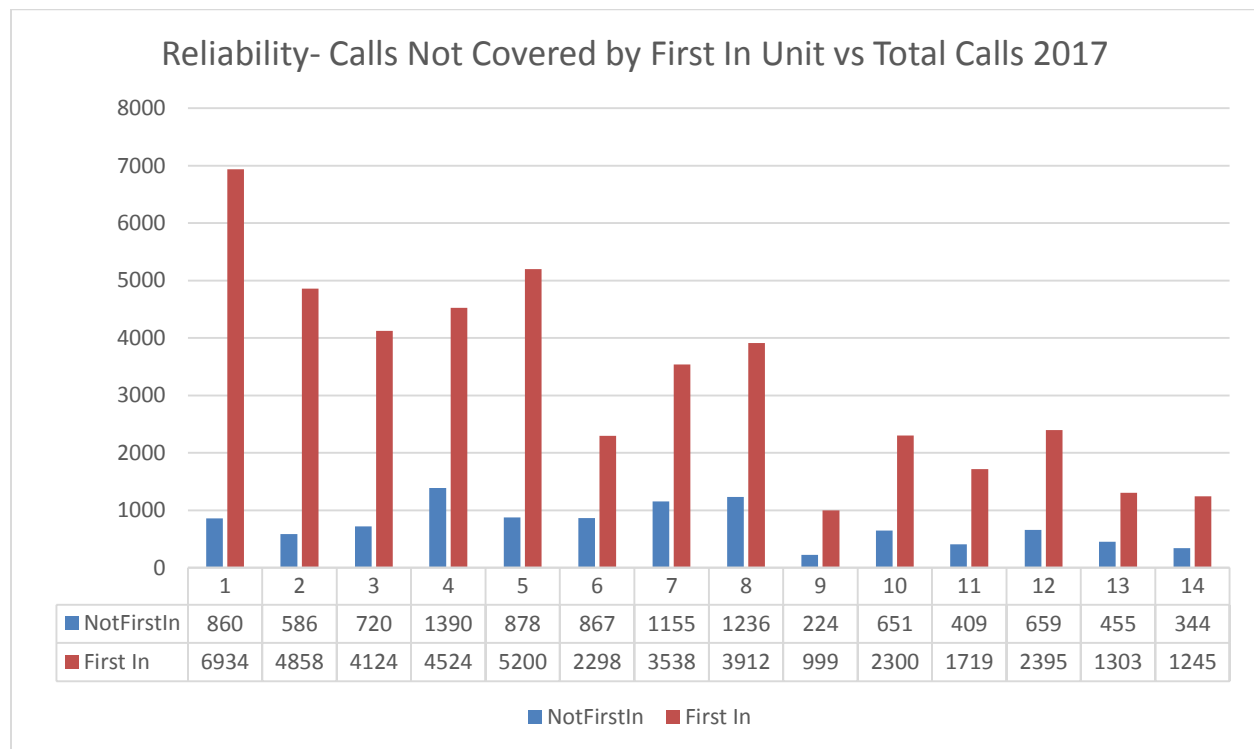
It is the Riverside Fire Department's goal to improve total response time by breaking down the components of response goals as follows:

- ✓ Call processing at 1 minute 30 seconds (with EMD) for 90% of all incidents
- ✓ Turnout at 1 minute 30 seconds for 90% of all incidents
- ✓ Travel time at 5 minutes for 90% of all incidents
- ✓ Total Response time at 7 minutes, 30 seconds for 90% of all incidents

## Reliability

A review of the reliability of resources found that the station had good reliability in the downtown/freeway area, and lack of reliability for secondary incidents on the peripheral edges of the city. Stations 7, 8, 9, 11 and 13 do not have secondary depth of coverage to the majority of their first due areas. Stations 8 and 13 also show a high number of calls that other units respond to in their districts. This is significant as there is no other unit close enough to respond in a timely manner when they are out of service/on another calls. Mutual Aid was reviewed with little improvement to depth of coverage at 5 minute response.

The workload in station 8's area is high, and attention to move up and coverage is necessary. In addition, station 4 has a significant number of calls that another unit responds to, however their depth of coverage is high—this indicates the high workload at this station with the primary unit unavailable servicing other incidents. Station 4 is approaching the maximum capacity of a single unit station. A single unit station with 3500 calls will not be able to serve its' area with 90% compliance. (See findings



## Critical Task Analysis

### Outcomes

Based on the Department's performance using existing Standard Operating Procedures and apparatus configurations the timeframe for evaluation is 9 minutes.

All time trials started with the arrival of the first due unit on-scene. Several important observations were made.

- A. The results were obtained under the best of circumstances, during daylight hours with optimum arrival of units.
- B. The total firefighter count on each unit varied for each scenario.
- C. The completion time for the various tasks was a function of both the number of personnel available, and the configuration of the equipment.
- D. There was a difference in the time interval to accomplish actual entry to a building depending on the number of personnel on the first due company. The critical variable was compliance with the two-in two-out rule. Companies with fewer personnel had to wait for additional backup.

As discussed in previous sections, the criterion for distribution is based upon getting a unit to the scene within a specified time period. Concentration is based upon getting a sufficient number of multiple units on the scene to mitigate the emergency.

The purpose of this section is to provide objective information on the tasks that can be performed by arriving fire companies and how much time it takes to deal with certain emergency events. The CTA demonstrated that the capacity of the RFD to perform is affected by a variety of variables including<sup>27</sup>:

- Arrival time of first in units
- Arrival time of secondary units
- Apparatus configuration
- Standard operating procedures
- Command and control activity by supervising officers

### Findings

The results of these evaluations indicate that the RFD has the capacity to keep a fire to the room of origin, restore airway breathing and circulation to a witnessed cardiac arrest and can stabilize and remove a trapped victim within the first nine minutes of a significant number of its emergencies.

The current deployment of resources is 3 engines, 1 truck, a squad and a BC. The purpose of 2 trucks was not validated on the simple structure fire. Truck resources are limited with only 3 available in the city, making it impossible to respond to 2 structure fires at the same time with city resources. Truck response is not always the closest resource. When first on scene, the truck performs truck duties and does not pull or lay hose. It is recommended that the agency review process for closest unit—sending the closest 1 truck and the closest 3 engines or trucks, whomever is closest. Keep the BC and Squad on initial response, and send 2 trucks only on working fires.

---

<sup>27</sup> See Exhibits CTA.xlsx

This CTA also indicates that monitoring actual performance and maintaining the current level of service cannot be taken for granted. The results clearly indicate that delaying the arrival of a second due company or reducing staffing levels on first due companies can result in degradation of performance. Outward growth on the edge of developed areas, or additional high risk development in infill areas will continue to place pressure on the RFD's ability to perform. Travel times may lengthen as a result of congestion and other factors resulting in reduced time in which a fire crew will have to actually mitigate the emergency.

### **Differences in Staffing and Equipment Configurations**

There was approximately a sixty-second difference between a three-person engine and a four-person engine in the time interval between arrival and point of entry on structure fires. There is also a significant difference in the performance of truck companies depending upon how the equipment is carried on the particular apparatus, and upon the assertion of command and control of truck officers. Both of these time trial components require further analyzed.

The critical task analysis demonstrates that with the variation in staffing there are some differences in the ability to enter the building during a working structure fire. This may, however, be offset by variations in the sequence of events depending upon apparatus configuration and staffing patterns. The various configurations used for dealing with traffic collisions (cut and rescue) and cardiac arrest (ALS) do not have a significant variance in performance.

The reduction of Squad 5 will compromise safety due to extending the dedicated Rapid Intervention Team time of response for additional Squad.

### **Additional Risk Levels**

This data also pointed out that the level of risk is a component of determining critical tasks. These exercises did not take into consideration the time elements of accessing multiple floors in high-rise occupancies. It is anticipated that subsequent studies will involve these components.

### **Summary**

The purpose of this section was to validate through critical task analysis the research into an effective response force's ability to perform on the fire ground. A systematic approach was taken to evaluate a specific scenario that occurs frequently in Riverside. Utilizing historical data from RFD's Management Information System, the level of service and current response time performance were used to create a series of time trials. The time trials were used to evaluate the performance of fire companies. The fire companies who performed this work were selected based on availability and were representative of performance that could be expected on a day-to-day basis in the field.

The evolutions were conducted multiple times and observed by multiple evaluators to verify the data. To further validate the conclusions of this study, a review was conducted of the records of all working structure fires handled by the department from the previous year. It is recommended, based on the performance of the fire companies, that the current deployment plan should be adjusted. It was determined that the current response time goals provide a level of service that is effective in mitigating loss

## Plan for Maintaining and Improving Response Capabilities

During the course of reviewing data and writing the SOC, several maintenance methodologies have been planned or implemented. The first such plan was to have FireHouse RMS software create exception reports for administrative review on a weekly/monthly basis. The following reported exceptions are under review:

- Call processing time exceeds 2 minutes 30 seconds: Review reason behind delay and address issue if possible. Assigned to Administrative Deputy Chief as intermediary with Riverside PD Communications Center.
- Turnout Time exceeds 2 minutes: Review with staff to ensure compliance and address issues identified if delay was warranted. Assigned to field BC-report to Operations Deputy Chief.
- Travel Time exceeds 6 minutes: Review and document all extended in City responses. Assigned to field BC-report to Operations Deputy Chief.

In addition to exception reporting, all CFAI time measurements will be reviewed monthly by the Accreditation Manager and Fire Chief, and at least annually with all executive staff.

## Summary of Findings

The action items resulting from SOC are also part of the plan for improving and maintaining services. The following summary of findings shall be further studied by the department:

1. Traffic: Technology solutions such as Emergency Vehicle Preemption (EVP) are very cost-effective when done in conjunction with other work or when the signal is first installed (CEQA process). Center median breaks, drive-over or crawl-over sections in median or simply leaving painted medians rather than raised medians have positive impacts on responding units. Work with the Traffic Engineer, Police Department, and bus services to agree on a system that can be jointly used and economically implemented thru standard conditions and CEQA.
2. Time of Day: Call load increases at 7 am and starts to decrease at 8 pm. Time of day is important when reviewing decisions such as training, up-staffing, and unit placement. Examples of effective decision making are having additional 12 hour peak activity unit assignments, up-staffing units for up to 12 hours during extreme events, or scheduling night training or system/vehicle upgrades.
3. Staffing: Overall conclusion is that the city is minimally staffed and would benefit from additional truck/squad placements on the southeast area of the city.
4. Critical Task Analysis: There are minimal trucks in the system. During analysis, it was apparent that trucks do truck work even when capable of performing first in engine duties. It is recommended that the agency review process for closest unit –sending the closest 1 truck and the closest 3 engines or trucks, whomever is closest. Keep the BC and Squad on

initial response, and send 2 trucks only on working fires. Review processes of first on scene actions – does a truck stay with truck work, or if another truck is coming does it take over first unit engine duties? A balance between specialty truck work and water on fire during initial attack must be addressed procedurally.

5. Reliability: The city has minimal secondary coverage on outer edge of city areas and pockets of high call workload.
  - a. The workload in station 8's area is high, and attention to move up and coverage is necessary.
  - b. Station 4 has a significant number of calls that neighboring units responds to, however their depth of coverage is high—this indicates the high workload in Station 4's first due. Station 4 is approaching the maximum capacity of a single unit station.
  - c. A single unit station with 3500 calls per year will not be able to serve its' area with 80% compliance.
  - d. Use the depth of coverage map to select brown out or move up and cover policy options. Edge of city stations 7, 8, 9, 11, and 13 do not have the depth of coverage that the center city stations display.
6. GAP Analysis: Depth of coverage shows gaps in response capabilities in several areas. There are 2 issues in gap analysis:

Safety: two-in two-out coverage is required for OSHA standards for firefighter safety at entry to fire incidents. It is critical that crews enter buildings rapidly and safely. The resolution is either to have 4 personnel on all primary firefighting units, or be able to rapidly accumulate 4 personnel at scene. Maintain 4 person staffing at all stations.

Stations 9, 11, and 13 are isolated and depth of cover is minimal. Every working fire in these stations' first due needs to be evaluated for second due unit arrival time. Was there a higher loss of life or loss of property average in these areas than the city center? Were there Firefighter injuries or rescue exception issues? Analyze independently each incident and overall effectiveness of area design to conclude if the cost benefit of adding additional units will meet the needs of the city. It is recommended that additional units or formal seamless automatic aid is evaluated and implemented in isolated areas as available or as needed.

Stations 7 and 8's areas can be augmented with automatic aid from Riverside County stations or Corona FD. An active automatic aid agreement with notifications of unit availability should be reviewed and implemented. Adding a squad to assist with coverage of station 7 and 8's district was suggested. The squad could be housed at one of the stations. This would add depth of coverage to both districts.

Coverage: Simply put, you must have enough resources to cover the area served within the time frames adopted for response. This is the standard of coverage and the decision making process for services provided. With this said, governing authority must identify if they wish all residents to receive the same level of service or is less service where there are fewer calls acceptable. Downtown areas are covered well, have reliable back

up, and are busy. Outer edge stations are not covered well, have no reliable back up but are not overly busy.

The city deployment is a policy decision. Does the city want a system designed to serve all residents within the standard, knowing that concurrent calls may leave up to 10% outside the standard? OR, does the city want a system designed to serve 90% of the city 100% of the time? This policy would direct the fire department in its practices.

Truck coverage is not available at FS11 or 13's districts within an acceptable time frame to be effective. Add to the fact that FS13's district is being developed with large industrial buildings and complexes. Consideration to change FS13 to a Truck/Quint with 4 personnel is recommended. With an eventual change to an Engine and Truck combination station when buildout is complete. Use the CEQA process to condition projects in the area for fair share funding of capital costs for added capacity.

7. New Peak Activity Units: FS04 has reliability issues due to high call load for a single unit station. FS05 has the airport. If a full time additional squad cannot be funded, possibly a part time squad can be used until growth exceeds capabilities. EX: Add a squad, perhaps even a quick attack pump capable squad, to FS04 Mon-Fri from 7am to 5pm. Add an engine or quick attack with AFFF to the airport Mon-Fri from 7am to 6pm. A station would not be needed, but office space would be. Store the engine at FS05 or FS07.



## Exhibits

### Exhibit Name

---

1. [10 Minute Response Coverage S1 moved to S3](#)
2. [10 Minute Response Coverage S1 moved to S9](#)
3. [10 Minute Response Coverage S1 S2 S5](#)
4. [10 Minute Response Distribution Coverage B1 B2](#)
5. [2014 Workloads](#)
6. [2016 Response Times](#)
7. [2017 Response Times](#)
8. [5 Minute Response Distribution Coverage No Mutual Aid](#)
9. [5 Minute Response Distribution Coverage With Mutual Aid](#)
10. [8 Minute Response Distribution Coverage T1 T2 T3](#)
11. [Baselines EMS](#)
12. [Baselines EMSTC](#)
13. [Baselines Other Fires](#)
14. [Baselines STR](#)
15. [BC Responses by Year](#)
16. [Buildings over 100,000 Sq Ft](#)
17. [Buildings over 3500gpm Needed Fire Flow](#)
18. [Buildings over 55 Ft High \(High Rises\)](#)
19. [Buildings over 75 Ft High](#)
20. [City Demographic Pie Chart](#)
21. [CTA EMS Tasks](#)
22. [CTA Structure tasks 1-7 Chart](#)
23. [CTA Structure tasks 7-14 Chart](#)
24. [CTA TCCR Tasks](#)
25. [Depth of Coverage: Engines and Trucks](#)
26. [Engine Responses by Year](#)
27. [Evacuation Route Map](#)
28. [External Stakeholder Study Chart](#)
29. [Fire Hazard Map](#)
30. [Flood Dam Map](#)
31. [Flood Hazard Map](#)
32. [FS1 FireRisk Assessment](#)
33. [FS10 FireRisk Assessment](#)
34. [FS11 FireRisk Assessment](#)
35. [FS12 FireRisk Assessment](#)
36. [FS13 FireRisk Assessment](#)
37. [FS14 FireRisk Assessment](#)
38. [FS2 FireRisk Assessment](#)
39. [FS9 FireRisk Assessment](#)
40. [Hazardous Materials Site Map](#)
41. [Incidents by Battalion 2015-17 Chart](#)
42. [Incidents by Day of Week by Year](#)
43. [Incidents by First Due 2015-17 Chart](#)
44. [Incidents by Hour of Day 2015-2017](#)

45. [Land Use Map](#)
46. [Liquefaction Zone Map](#)
47. [List of Equipment and Assigned Station](#)
48. [Neighborhood Community Name Map](#)
49. [Out Of Compliance > 5 Minute Travel Time](#)
50. [Out Of Compliance by First Due > 5 Minute Travel Time](#)
51. [Police Zone Map](#)
52. [Population vs Incident Correlation](#)
53. [Probability and Consequence Chart](#)
54. [Reliability-Calls Not Covered by First In Unit vs Total First in Calls](#)
55. [Response Zones: CMA](#)
56. [Risk Analysis Summary by Station](#)
57. [Riverside Airport Map](#)
58. [Seismic Fault Map](#)
59. [Soils Map](#)
60. [Squad Responses by Year](#)
61. [Total Responses by Unit 2015](#)
62. [Truck at FS11 10 min response area](#)
63. [Truck at FS13 10 min response area](#)
64. [Truck response area for 10 min 1,2,3](#)
65. [Truck Responses by Year](#)
66. [Workload 2015 by CMA](#)
67. [Workload History - 17 years](#)
68. [Zoning Map](#)